



Keeping It Green

A Study of Open Space Conservation Efforts in the Triangle



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Foreword

“Make no little plans. They have no magic to stir men’s blood and probably themselves will not be realized. Make big plans. Aim high in hope and work. Remembering that a noble, logical diagram once recorded will not die.”

This inspirational quote for Daniel H. Burnham, the city planner who designed Chicago in the early 1900s, guided the early scope of this study and should continue to guide the study’s participants as they persevere in their efforts to conserve open space in the Triangle Region. Although at times Robert Burn’s quote “the best laid plans of mice and men often go astray” seems more fitting (both for the report and for open space preservation), it is important to remember why we do what we do. Whether it is a desire to protect the natural areas that we love, the farmland that we depend on, or the water that is critical for our survival, we are united in our goal to preserve our heritage, while providing for current and future generations. So we keep on going despite tough economic times, relentless development pressure, and surmounting environmental challenges by developing partnerships and innovative ways to solve age-old problems. Knowing that we can’t save it all but we should save what we can.

The following report could not have been completed without the assistance of many busy and passionate people who contributed their time and expertise. A special thanks to all the study participants, GIS technicians, and data providers. The staff and board members of the Triangle Land Conservancy- especially George Hess, Leigh Ann Cienek, and Kevin Brice- who helped guide the process along and provided valuable feedback. Thanks to Paul Black with the Triangle J Council of Governments, who assisted with data collection and organization. Also to the librarians at the University of North Carolina, Chapel Hill - especially Jennifer Doty and Amanda Henley- I simply could not have created these maps without your help. Finally, I would like to thank my advisor Dr. Todd BenDor for pointing me in the right direction to this journey’s trailhead and having the patience to wait for me as I wandered through the woods.

Acknowledgements

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Executive Summary

This is the first report of its kind in the Triangle Region defined as Wake, Durham, Orange, Chatham, Lee, and Johnston counties in central North Carolina. Although there have been regional open space planning efforts in the past- most markedly the *GreenPrint of 2002* and the *State of Open Space Reports in 2000 and 2002*- this is the first report that combines GIS mapping and analysis with interviews of key stakeholders and a review of plans relevant to open space protection. Thanks to advancements in mapping software and the management of parcel information and land acquisition by each county within the region, a more accurate and comprehensive map of conservation lands is now possible. The availability and accuracy of maps displaying the latest information on conservation lands and easements will play a critical role in the region's ability to conduct open space planning on regional projects.

The major finding of this report is that the calculated acreage of conserved lands according to GIS analysis is greatly below the acreage of conserved lands being reported by the different municipalities, non-profit organizations, and federal or state agencies. When the conservation lands and conservation easement shapefiles of the One NC Naturally planning tool were merged, clipped by county boundaries, and dissolved to form one layer with no duplicated properties, the total acreage of land conserved within the Triangle as of July 2009 was 155,499 acres. This is actually about 200 acres less than what was reported in the *2002 State of Open Space Report* (Costa, 2002). If progress has been made in land conservation within the Triangle how is this possible?

There are a couple of explanations for these findings. In some cases, especially with the larger management areas such as those surrounding Jordan Lake or Falls Lake, the same property had multiple property owners each reporting part or all of the property. While this is a good indicator that regional partnerships are occurring, it also leads to an overestimation of the actual land that is being protected through conservation measures such as *fee simple* purchase or conservation easements. Another possible explanation is the definition of what is being considered open space is different from one report to the next. For example, the *2002 State of Open Space Report* includes corporate lands while the category of corporate lands was not included within the One NC Naturally database (Costa, 2002).

In an attempt to provide a reasonable comparison from the *2002 State of Open Space Report* to this report, the sum of acreage conserved in each county by owner type was also calculated without dissolving the features. Through this analysis, a total of 176,111 acres were conserved as of July 2009 with three of the counties (Durham, Johnston, and Orange) experiencing large gains and two experiencing losses (Chatham and Lee) partly due to the reassignment of

properties strictly within county boundaries (see the section on an Overview of Conservation Efforts for these tables).

The findings of this report- both through the interviews and GIS analysis components- bring to light some important questions and data needs for further analysis:

1. What is Open Space and is it possible or wise to have a regionally accepted definition?
2. How is the region doing in its conservation efforts and how is this progress measured?
3. Can an inclusive yet user friendly database be developed to accurately track the progress of conservation efforts?
4. What are the challenges and assets to open space preservation and how can the region increase its conservation efforts? and
5. What are the next steps in regional conservation planning?

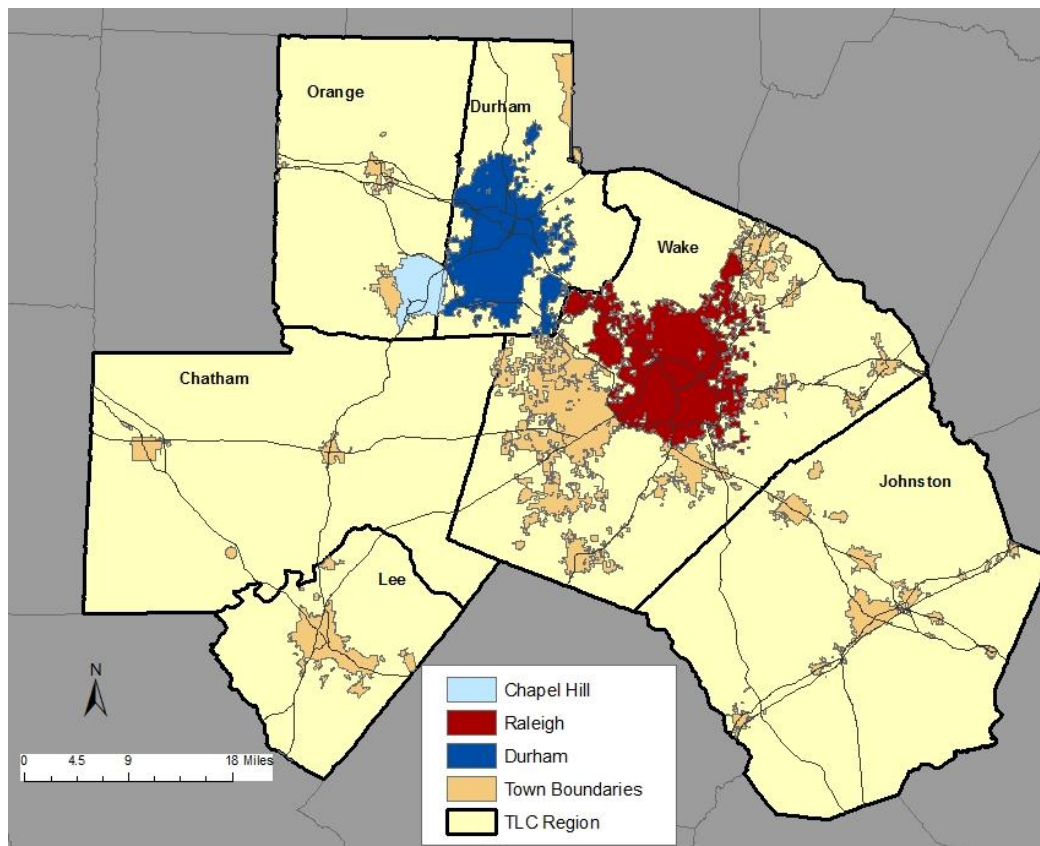
Hopefully, this report will answer some of these questions and serve as a catalyst to promoting the increased regional collaboration necessary for effective open space preservation.

Introduction

Overview of the Triangle

The Research Triangle, as the region encompassing Raleigh, Durham, and Chapel Hill has been commonly referred to since the 1950s, offers its residents a superb quality of life. With the vast number of graduates from the University of North Carolina Chapel Hill, North Carolina State University, and Duke University staying in the region and taking positions in medical research, science, and technology available at the Research Triangle Park, the region is considered one of the most educated in the nation. This high level of education and job availability, along with the outstanding entertainment and recreational opportunities found within the Triangle make the region a great place to live.

Figure 1 Map of the Triangle Region



Map by: Katherine Hebert

Therefore it is no secret that rapid growth is taking place within the Triangle Region, which for the purposes of this report includes Wake, Orange, Durham, Chatham, Lee, and Johnston County, North Carolina. It is estimated that Raleigh alone experienced a gain in population of approximately 116, 450 people between 2000 and 2008 (US Census Bureau, 2010). This is

equivalent of 40 people moving in each day for eight years. This population growth requires increased housing development.

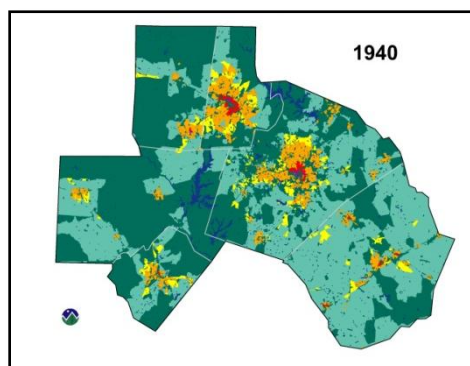
The table below shows the number of building permits reported for each major municipality and the unincorporated areas within the Triangle's six counties from January 1997 to 2010. A total of 169,287 building permits were issued with the majority of these being for single family houses. Assuming a typical density of two dwelling units per acre (although low density housing patterns consist of anything between one unit per multiple acres to four units per acre), the 217,191 dwelling units constructed during these 13 years have consumed close to 108,600 acres of land. To put that in perspective, the total area of Durham County is 191,100 acres.

Table 1 Total Building Permits in the Triangle from January 1997-2010

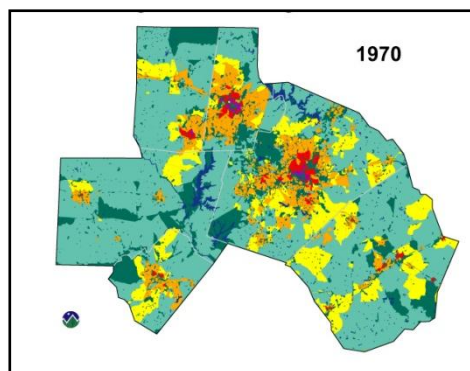
	Buildings	Units	Construction Costs (in Billions \$)
Chatham County	6,638	7,128	1.56
Durham	21,993	33,749	4.02
Johnston	16,577	16,868	2.15
Lee	3,603	4,235	0.49
Orange	10,764	12,538	2.03
Wake	109,712	142,673	20.03

Source: US Census Bureau, 2010

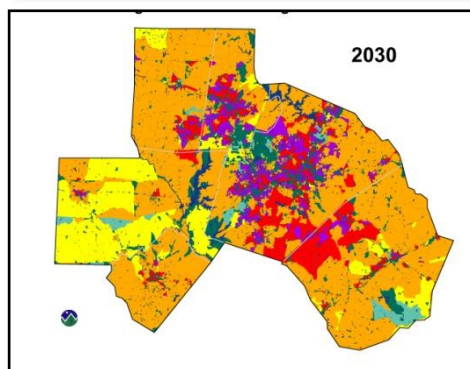
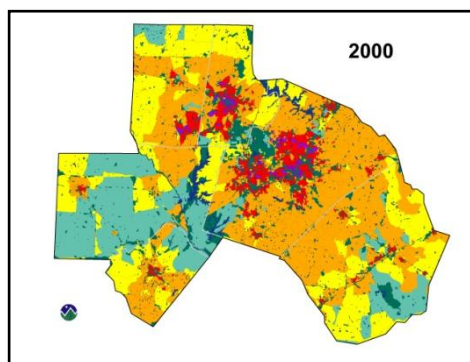
Figure 2 Housing Growth in the Triangle



The maps to the left show the housing density within the Triangle region, measured as housing units per square kilometer (Ingerson, 2007). Housing units include both year-round primary residences and seasonal homes. The maps do not show conserved lands within the housing density blocks, because researchers do not know the exact position of houses and therefore must color the entire census block as one color to represent the overall density level.



As shown by the table of building permits and these maps, the pace of growth has been rapid within the Triangle. This growth has placed a severe strain on the region's resources including its undeveloped land, pristine natural areas, water bodies, and operating farmlands and forests (Costa, 2002). In order to control this rapid growth and preserve the quality of life attracting businesses and families to this region in the first place, a concerted effort to plan for, acquire, and provide stewardship for open space is needed (Costa, 2002).



Source: Ingerson, 2007

What is Open Space?

Open Space has been simply defined as “land left as fields and forests while other land is developed into homes and businesses” (Ahern, 1991). This is an oversimplified definition that continues to be debated among planners, recreation specialists, and conservationists. Participants in this study were asked how their organization or local government defines open space and each provided a slightly different answer. The questions of should the region have an agreed upon definition of what is considered open space and how to prioritize lands for conservation efforts would provide for an interesting discussion among conservation planners.

“We don’t have a set definition...it depends greatly on who is the audience and what we are trying to accomplish.”

*Rich Shaw, Orange County
Legacy Program Coordinator*

For the purposes of this report, open space will be defined according to the Triangle Land Conservancy’s definition. TLC (Costa, 2002) defines protected open space as land:

1. That is being managed primarily to fulfill an open space function (wildlife habitat, water quality protection, flood prevention, agriculture, forestry, recreation, sense of place, education, research, or air quality improvement), and
2. That is owned or managed by a public agency or non-profit organization whose mission, at least in part, is to conserve and/or manage open space for public benefit (but not necessarily public access), and
3. For which the owner
 - a. Has either made a long-term, public commitment to using that land for that purpose or
 - b. Would have to go through a public process to change its use.

Why do we need Open Space?

There are many environmental, economic, and social benefits of preserving open space. Environmental benefits to open space conservation include: providing habitat for healthy populations of plants and animals to preserve biological diversity; protecting critical bodies of water including coastal areas, wetlands, and rivers; purifying the air, water, and soil; and providing climate controls (Mason, 2008). Each of these benefits is important to the well-being of the human population as well as the overall stability of the planet's ecosystems. Since the early 1990s the holistic ecosystem management model has taken root within the policies and partnerships of federal, state and regional departments as it has become increasingly obvious that protecting small or isolated islands of habitat is not enough to maintain the systems needed to reap these benefits (Mason, 2008 and Endicott, 1993).

Will Rogers, President of the Trust for Public Lands, summarizes the character of land preservation in economic terms quite well- "open space conservation is not an expense but an investment that produces important economic benefit" (Lerner, 1999). Open space protection can reduce the likelihood of sprawl development that consumes more land than high density development, requires more infrastructure, increases daily commutes, lowers real estate values, and reduces quality of life (Lerner, 1999). In addition to reducing the negative impacts of sprawl, open space protection can generate economic activities such as recreational tourism, attracting new businesses, farming, and forestry (Lerner, 1999). The natural systems protected by land preservation also serve important economic services such as flood and climate change reduction, pollination, filtration of pollutants, decomposition, soil and water conservation, and the provision of building materials, medicines, pigments, and spices (Lerner, 1999). Because open space provides so many services naturally that would otherwise have to be provided by local governments, it is far more expensive to undo the damage of developing open space than it is to protect it in the first place.

Open Space Functions

Wildlife and Native Plant Habitat- Open space provides habitat for native plants and animals that cannot live in urban and suburban environments. Some species depend on large wooded tracts for their survival, while others need grassy areas for habitat.

Water Quality Protection and Flood Prevention- Wetlands, vegetated stream buffers, and natural floodplains filter urban stormwater run-off, reducing the amount of pollutants entering streams, and retaining floodwaters.

Agriculture and Forestry- Agriculture and forestry cannot remain financially viable without large open spaces in which they can be practiced. These landscapes are also an important part of the region's cultural heritage.

Recreation- Hiking, biking, horseback riding, hunting, fishing, camping, and bird watching, are recreational activities that require extensive open spaces and natural areas.

Sense of Place- Open space is a component of many of the things that help define our region's character, like farmland, historic sites, and scenic vistas.

Education- We use open spaces in the Triangle as both classrooms and research laboratories for ecological, agricultural, and forestry studies.

Air Quality Improvement- Vegetation in open spaces absorbs carbon dioxide and other pollutants from the atmosphere and provides shade, reducing air pollution levels and cooling the air.

The social benefits of preserving open space include: providing ways for people to connect with nature by enjoying scenic vistas or participating in recreation, education, and research; sustaining a natural heritage; and developing a sense of place (Triangle GreenPrint, 2002). Open space conservation is also an important part of American history culminating in the formation of national parks and wildlife refuges since Yellowstone in 1872. In his foreword to a book describing the need for private/ public partnerships in land conservation efforts, former U.S. Senator John H. Chafee began with this statement: “Open, undeveloped land and the freedom and possibilities it represents has always been an important part of the American identity”(Endicott, 1992).

The North Carolina Million Acre Initiative

Organized by the North Carolina Department of Environment and Natural Resources (DENR), the goal of the Million Acre Initiative is to preserve one million additional acres of open space in North Carolina between 1999 and 2009. This is a coordinated effort among many federal, state, local, and nonprofit agencies to fund and acquire open space with the objectives of:

- Fostering partnerships among private and public land protection partners,
- Promoting regional open space planning, and
- Providing information about the importance of open space protection. (NC Million Acre Initiative, 2009).

If the one million acres was evenly divided across the state by land area, then the Triangle would be responsible for protecting 63,000 acres (Costa, 2002). However, if the million acres were attributed to counties based on population, the Triangle would be responsible for 150,000 acres. As of 2009, the Triangle has protected a total of 155,499 acres which is only 9,431 more acres than what was recorded in the 2000 State of Open Space Report. This is 15% of the rate needed to preserve 63,000 acres and 6.3% of the rate needed to preserve 150,000 acres.

The Triangle’s progress is representative of the state’s progress as a whole. As of the *2007 Annual Report for the Million Acre Initiative Goal*, a total of 589,685 acres had been conserved across North Carolina (NC Million Annual Report, 2007). While this is still a commendable feat, this is far short of the one million acre goal. It is safe to say that with the national economic decline of the last two years this goal is not likely to be met; however, some very useful regional conservation planning tools have come out of this initiative including additions to the One NC Naturally database used to map conservation lands and easements throughout the state. It is also interesting to note that the Triangle region is highlighted prominently on the Million Acre Initiative’s website with *Wake County’s Open Space Partnership Grant Program*, the *Town of Cary’s Open Space and Historic Resources Plan*, and *Orange County’s Environment and Resource Conservation Department* being listed as three of the five internet resources.

Who is working on Open Space Preservation?

There is a wide variety of partners- state and federal agencies, counties, local municipalities, non-profits, universities, and private organizations- contributing to open space conservation in the Triangle. The following list was taken from previous *State of Open Space* reports.

State and Federal Agencies

NC Department of Cultural Resources
NC Department of Transportation
NC Division of Forest Resources
NC Division of Natural Resources Planning and Conservation
NC Division of Parks and Recreation
NC Office of Conservation and Community Affairs
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
Wildlife Resources Commission

Non-Profits

American Farmland Trust
Conservation Council of NC
Conservation Trust for North Carolina
Ellerbe Creek Watershed Association
Eno River Association
NC Audubon Society
NC Botanical Foundation
NC Herpetological Society
NC Rails to Trails
People for Parks
Triangle Greenways Council
Triangle Land Conservancy
Trust for Public Land
Upper Neuse River Basin Association

Universities

Duke University
Johnston Community College
NC State University
UNC Chapel Hill

Private Organizations

Homeowner Associations
Landowners
Orange Water & Sewer Authority
Progress Energy
RDU Airport Authority

Counties

Chatham
Durham
Johnston
Lee
Orange
Wake

Municipalities

Apex
Benson
Broadway
Carrboro
Cary
Chapel Hill
Clayton
Durham City
Four Oaks
Fuquay-Varina
Garner
Goldston
Hillsborough
Holly Springs
Kenly
Knightdale
Mebane
Micro
Morrisville
Pine Level
Pittsboro
Princeton
Raleigh
Rolesville
Sanford
Selma
Siler City
Smithfield
Wake Forest
Wendell
Wilson's Mills
Zebulon

How can we Preserve Open Space?

There are many measures that the different partners can take to increase the amount of land being preserved or better protected within the Triangle. The two most common measures of protection include *fee simple* purchase of property and the installation of perpetual conservation easements on all or a portion of property. Many factors, including available funding, the quality and purpose of the land, and willingness of landowners to limit future development or sell, will determine which properties are conserved and what tool is used to protect either all or a portion of a property. An extensive list of measures that different types of organizations can use were suggested by study participants and other resources and can be found below. Some of these recommendations are widely accepted and extensively used in North Carolina while others are more innovative and less frequently used.

“The number one asset to increased open space conservation is a growing awareness among the general public that communities must act now (or in the short-term) if they want a town or county that is livable well into the future.”

*Kevin Brice, Executive Director
Triangle Land Conservancy*

Private Landowners, Businesses, and Non-profits

Measures private landowners can take to conserve land include:

- Donating their land outright, by will, or through a trust to an interested land conservancy organization or government entity (Roe, 1985).
- Permanently limiting the use of their land by voluntarily granting a conservation easement on their property.
- In the case of farmers, participating in the Conservation Reserve Enhancement Program, the Conservation Reserve Program, Farmable Wetlands Program, or the Source Water Protection Program of the USDA Farm Service Agency (USDA FSA, 2009).
- For those with forests, participating in the Forest Legacy Program and working with state foresters to develop a multiple resources management plan.
- Property owners next to bodies of water should maintain a vegetated buffer along the water to limit shoreline erosion, prevent polluted runoff, and provide wildlife corridors along waterways.
- Landowners constructing homes should also pay attention to the size, location, orientation, and ecological footprint of the building. Consider using sustainable building supplies, water-efficient landscaping, energy-efficient appliances, insulation, and solar panels.

Measures businesses can take to conserve land include:

- Participating in conservation investment banking- often in partnership with banks, land conservancy organizations, and local governments- to: swap debt for nature conservation,

lend money linked to conservation, receive public recognition for environmentally and socially responsible investing, and avoid bankruptcy/ defaulting through the sale of land (Ginn, 2005).

- Developing new markets for environmental services such as: carbon sequestration, water rights and markets, forest bans, and wetland mitigation banking (Ginn, 2005).
- Taking advantage of incentives such as: green consumer programs, tax credits, Federal incentives, and the LEED certification program (Ginn, 2005).

Measures non-profits and land trusts can take to conserve land include:

- Assist government entities at the local, state or federal level with land conservation programs through:
 - Providing agility- mainly in the speedy acquisition of land, flexibility in land deals such as auctions, and creativity to develop financing arrangements that suit the needs of both property owners and conservation organizations.
 - Creating an atmosphere of possibility- landowners prefer to work with land trusts as a third party instead of governments which have the power to condemn land. Land trusts provide landowners and the public with important information on how their land can be preserved and the need for conservation. People are also more willing to donate funds to nonprofit organizations than government entities even when serving the same purpose.
 - Providing volunteers, trained staff, and experts to assist with open space planning, land evaluation, land management, and research (Endicott, 1993).

Local Governments, Regional Governments, and State Agencies

Measures Local Governments can take to conserve land include:

- Promote and conduct planning efforts such as: creating open space, greenway, and recreation plans; considering growth management tools such as urban growth boundaries, transfer of development rights, clustered neighborhoods, mixed use zoning, and impact fees; and promoting transit-oriented design.
- Other measures local governments could take include: proposing a sales tax referendums to preserve open space; organizing educational and community goal setting programs; purchasing and managing land for parks; and developing regional partnerships.

Measures regional governments or partnerships can take to conserve land include:

- Conducting regional planning efforts to identify key areas to conserve and providing municipalities with information.
- Providing coordination and communication between municipalities on joint projects or fundraising efforts.

Measures state governments can take to conserve land include:

- Increasing fundraising initiatives including: a state lottery; minimal entrance fees to state parks, increased license fees for fishing and hunting; state bond referendums; and increased taxes on cigarettes, gasoline, or alcohol (Endicott, 1993).
- Require local planning and provide smaller localities with financial and expert assistance needed to develop open space and recreational plans. Continue to tie the necessity of being part of a local or regional plan to project funding.
- Pass legislation to support localities in their efforts to implement growth management tools. Launch a state-wide smart growth initiative.
- Increase state funding for state departments working on land conservation issues such as the Department of Agriculture, Department of Forestry, and Department of Environmental and Natural Resources.
- Continue to support initiatives that provide statewide planning and information such as the One NC Naturally program and the Million Acre Initiative.

Challenges to Open Space Preservation

The number one challenge to open space preservation identified by study participants is the lack of funding for land acquisition, maintenance, programs, and staff. State funding for its open space trust funds (Clean Water Management, Natural Heritage, Parks and Recreation, and Farmland Preservation) have all been drastically reduced due to state funding cuts. In February 2009, \$100 million was transferred from the Clean Water Management Fund into the state's General Fund to help cover budget shortfalls, placing many grants on hold (Clean Water, 2008). The Natural Heritage Trust Fund also experienced an overall decrease of 24% from the previous year's income in 2008 (Natural Heritage, 2008).¹ A brief overview of funding sources for open space acquisition is provided later in the report within the section on regional conservation efforts.

Other challenges to open space preservation identified by study participants include: concern over the unknown costs to maintain lands in the long-term, the pace of urbanization, and the ability for citizens and elected officials to visualize the changes that will happen to the balance of open space and development at the regional level and over a long period of time (especially in rural areas).

¹ There was \$23,547,817 in 2007 and only \$17,850,401 in 2008, mainly due to a large decrease in the amount of real estate transfer tax revenue.

Goals and Methods of this Report

The overarching goal of this report is to provide those working on conservation efforts within the Triangle Region with all the tools and information they need to increase their conservation efforts within one report. The report is intended to be used as a resource and a dialogue starter. While speaking with study participants it was interesting to discover that many of them were looking forward to comparing what was happening in their county to the conservation efforts in other counties. I hope this comparison includes a series of discussions between study participants about natural areas of mutual interest, potential partnerships, and innovative techniques for open space planning and land acquisition.

Other goals include:

- Updating and improving upon existing reports including the *State of Open Space* reports prepared by the Triangle Land Conservancy.
- Developing a geo-database of files that could be used to develop additional maps and combine files across common fields.
- Identifying the challenges, facilitators, benefits, funding sources, and measures to increase conservation efforts.
- Sharing the results of this study with study participants, decision makers, and the public.

Methodology

A three-pronged approach was taken to accomplish these goals- interviews, mapping, and an in-depth literature review and plan analysis.

Interviews

I conducted a series of interviews with county stakeholders (see Appendix: V). Each interview lasted about half an hour as participants were asked a list of questions concerning their background and the planning, funding, mapping, and organizational structure of their county in regards to open space conservation (see Appendix: IV). These interviews were used to collect additional data on available open space plans within the county, available GIS data, and the amount of funds spent on open space acquisition by each county. Perhaps the most interesting responses were to the questions included under the heading of organizational questions. Many of these answers were used to construct the sections of the report on the definition of open space, the challenges of open space preservation, and the next steps in regional conservation.

GIS Mapping and Analysis

Following the interviews, GIS data provided by each county, from the One NC Naturally Open Space Conservation dataset, and other sources (for files such as major roads, county boundaries, etc.) was used to compile a geodatabase of shapefiles, create maps, and conduct an analysis of

the conserved acreage. The following process was used to create the maps found within the Land Conservation Efforts section of this report.

The Regional Conservation Lands map and the County by County Open Space maps were created using GIS files from the Conservation Planning Tool for North Carolina: Open Space and Conservation Lands database found at <http://www.conservision-nc.net/>. Two files, conland0709 and easements0709, were merged to create a single shapefile containing all of the conservation easements and conserved lands within North Carolina. The file was then clipped to contain just the conserved lands and easements found within the Triangle Region of Wake, Orange, Durham, Lee, Johnson and Chatham counties (this shapefile was created earlier by selecting these counties from a shapefile containing all of North Carolina's Counties). A field was added to the merged conservation lands and easements file to display the county name and a spatial join was used to fill this field.

The attribute table was then sorted by the Type field and the listed owner types were condensed to match the categories found within the *2002 State of Open Space* report including federal, state, local (county, municipal, other public, and local), nonprofit (land trust, conservation group, and other nonprofit), or university (reassigned Duke Forest and Schenck Forest to university). The regional map was created using this file, a file of North Carolina counties, and a file of the major North Carolina roads (reduced to U.S. highways and interstates and clipped to the Triangle Region). Colors were assigned accordingly:

- Federal- Tuscan Red
- State- Ultra Blue
- Local- Macaw Green
- Non-Profit- Electron Gold
- University-Aster Purple
- TLC Region- Yucca Yellow
- Other Counties- Gray10%
- Roads- Gray 60%

For each of the county maps, the conservation lands/easements file and major roads file were then furthered clipped to the county's boundary. If the county had any additional files such as the location of its parks or additional conservation lands then they were added to the map of that county but not added to the calculation of conserved acres.

For the Triangle Lands Conservancy Projects map, shapefiles provided by the Triangle Land Conservancy were simply placed on top of the TLC region shapefile created for the Regional Conservation Lands map.

All of the files necessary to create these maps were stored in a geodatabase given to the Triangle Land Conservancy. Additional files including a combination of tax parcel information with

conserved lands and conservation easements by county were also prepared and included within the geodatabase.

In addition to creating maps, ArcGIS was used to calculate the acreage of conserved lands within each county. The process used to do this was to take each county map and dissolve the conserved lands and easement features to remove any duplicates. Then a field was added to the dissolved attribute table and the geometry calculated for area in acres. This calculated the acreage of conserved lands within the boundaries of the county. Note that this is a different methodology from that used within the *2002 Open Space Report* where participants were asked for the acreage conserved. Once the county acreage was calculated then a sum could be taken to determine the total acres conserved within the Triangle.

Literature Review and Plan Analysis

Additional research was done to provide background information for this report, suggest recommendations, describe key regional resources, and track the history of state funding for land acquisition. Relevant plans were also studied and highlighted within the County-by-County Assessment. A full list of resources and relevant plans is available at the end of this report.

Land Conservation Efforts

Overview of Conservation Efforts

According to the GIS analysis discussed in the section on methodology, as of July 2009, 155,499 acres of land have been protected through conservation easements or fee simple purchase in the Triangle. This represents 7.3% of the Region's total area and a per capita rate of 0.1 acres per person². Since the last *State of Open Space Report* in 2002, approximately \$110 million has been spent on land acquisition by Wake, Orange, Durham, Lee, Johnston, and Chatham counties (through tax revenue, grants, bond referendums, donations, etc.). The Triangle Land Conservancy reports another \$48 million in land value being conserved since 2002 (Leigh Ann Cienek, 2010).

Table 2 shows the protected open space through June 30, 2002 by county and owner type from the last *State of Open Space Report* (Costa, 2002). This table was produced from information collected from surveys completed by the counties, major municipalities, non-profits, universities, as well as the state and federal agencies with conservation lands within the region. It is important to note that this methodology differs greatly from the methodology used to calculate the acreage of lands conserved within this report, thus making an accurate comparison from 2002 to 2009 difficult.

In order to create a more comparable chart, a table with conserved lands and easements as of July 2009 was created with acreage being calculated by owner type prior to the data being dissolved into the separate counties (see Table3). There may be cases where the same acreage has been counted multiple times across owner categories or between multiple counties. Because of these possible duplications, the acreage calculated using the previously mentioned GIS analysis was used for the total acres listed at the beginning of this section.

² Per Capita rate based on the 2008 estimated population for each county provided by the U.S. Census Bureau, totaling 1492166 people.

Table 2 Protected Open Space through June 30, 2002 in Acres by County and Owner Type

	Chatham	Durham	Johnston	Lee	Orange	Wake	Total
U.S. Army Corps of Engineers	39,043 Jordan Lake (13,064 water, 25,979 land)	14,242 Falls Lake (4,827 water, 9,415 land) 5,154 Jordan Lake (124 water, 5,030 land)	0	0	81 Jordan Lake (all land)	18,532 Falls Lake (6,512 water, 12,020 land) 1,715 Jordan Lake (all land)	78,767 (54,240 land, 24,527 water)
NC Division of Parks and Recreation	0	789 Eno River State Park	0	0	1,878 Eno River State Park 124 Occoneechee Mountain	92 Hemlock Bluffs Cary Park 93 Mitchell Mill Natural Area 5,481 Umstead State Park	8,457
Other State Agencies	0	37 Bennett Place 850 Butner Falls of Neuse Game Lands 77 Historic Stagville 45 Duke Homestead	231 Bentonville Battleground 354 Clemmons Educational Forest 488 NC Department of Agriculture Central Crops Research Station 50 NC Department of Transportation Wetland Mitigation	426 Endor Iron Furnace	0	149 Clemmons Educational Forest 606 NC Department of Transportation Wetland Mitigation 21 NCSU Schenck Forest 314 Yates Mill Park	3,648
Corporate Lands	3,091 Chatham/ Cape Fear Game Lands 6,736 Shearon Harris Game Lands	0	0	2,421 Lee Game Lands	0	680 Harris Lake County Park 1,267 Harris Research Tract 200 Lake Crabtree County Park 8,250 Shearon Harris Game Lands	22,645
Local Government	37 City 40 County	1,760 City 634 County 1,498 Water Supply	303 City 0 County	65 City 208 County	568 City 772 County 2,817 OWASA	10,527 City 470 County 1,100 Water Supply	20,799
Universities and Colleges	940 Duke Forest 341 NCSU Hope Valley Forest	1,553 Duke Forest 2,451 NCSU Hill Forest	2,996 Johnston Community College Howell Woods Environmental Center	0	4,917 Duke Forest 600 UNC Botanical Garden 544 University Lake	2,329 NCSU Agriculture Field Labs 212 NCSU Land Leased for Yates Mill Park 262 NCSU Schenck Forest	17,145
Land Trusts, Non-Profits, Other	34 Conservation Trust for N.C. 4 Deep River Park Association 100 NC Herpetological Society 1,280 Triangle Land Conservancy	13 Ellerbee Creek Association 146 Eno river Association 2 Triangle Land Conservancy	429 Triangle Land Conservancy	1 Deep River Association 257 Triangle Land Conservancy	267 Classical American Homes (Ayr Mount) 143 Conservation Trust for NC 23 Eno river Association 84 Moorefields 10 Nature Conservancy 121 NC Botanical Garden Foundation 1,099 Triangle Land Conservancy	12 NC Nature Conservancy 19 People for Parks 188 Triangle Land Conservancy	4,232
Total	51,646	29,251	4,851	3,378	14,048	52,519	155,693 21

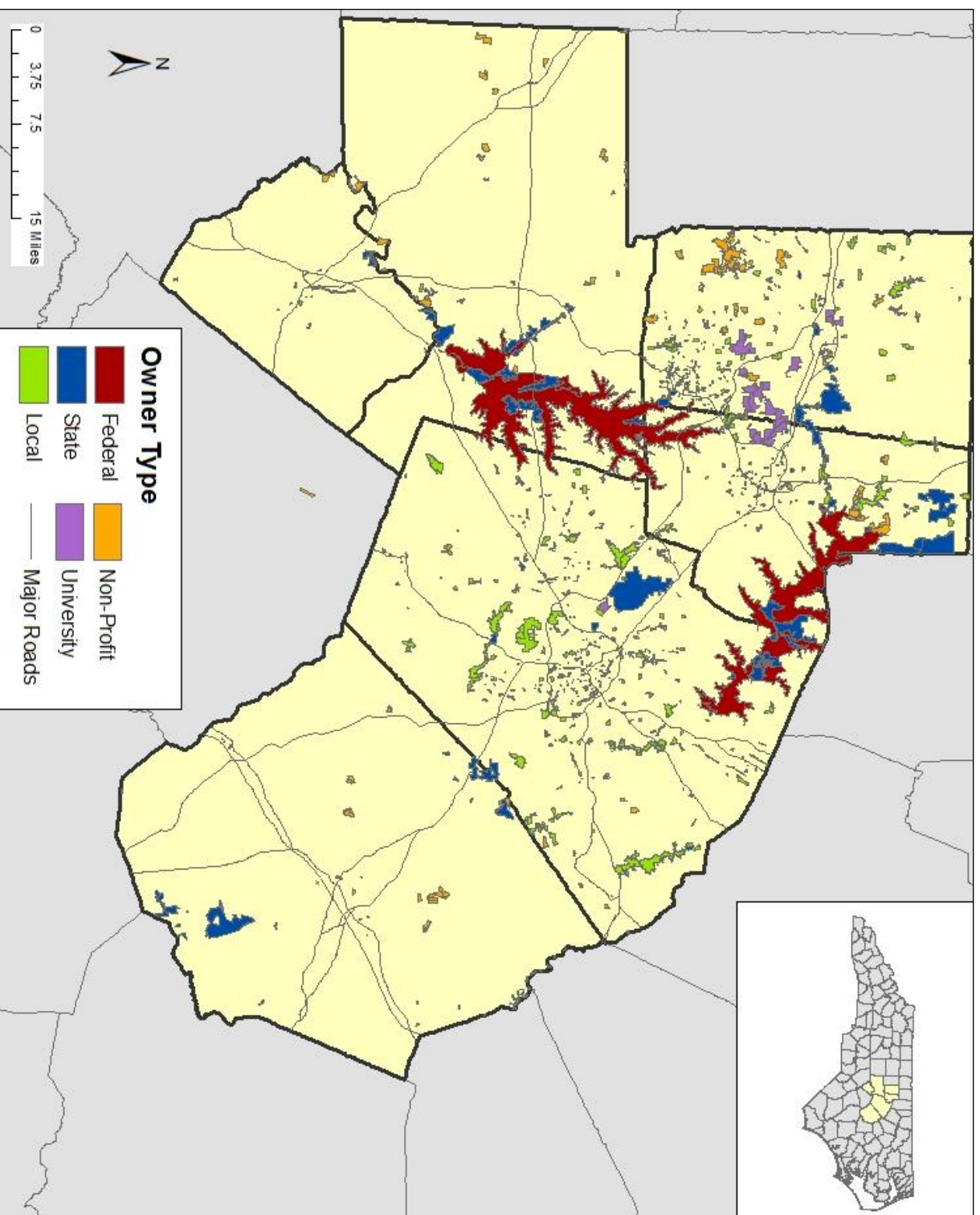
Source: Costa, 2002

Table 3 Protected Open Space Through July 30, 2009 in Acres by County and Owner Type

	Chatham	Durham	Johnston	Lee	Orange	Wake	Total
Federal	39,143 Jordan Lake	5,343 Jordan Lake 14,599 Falls Lake	0	0	286 Jordan Lake, etc.	1,653 Jordan Lake 18,404 Falls Lake 26 Other	79,454
State	7,410 Hope Valley Forest, Jordan Lake, Lower Haw, Pegg, Powell, Stevens Parks	8,883 Camp Butner, Hope Valley Forest, Hill Demonstration Forest, Stagville Center, Falls Lake, Eno River, etc.	5,593 Howell Woods, White Oak Creek, Clemmons State Forest, Mountains to Sea Trail, Bentonville Battlefield, etc.	856 Deep River, Endor Iron Furnace	5,172 Eno River, Occoneechee Mountain, Chapel Hill Conservation Lands, etc.	11,529 Umstead, Falls Lake, Clemmons State Forest, Swift Creek, Hemlock Bluffs, Mitchell Mill etc.	39,443
Local Government	61 Bynum Park and Pittsboro Lake Park	4,083 Little River Reservoir, West Point on the Eno, New Hope Creek, etc.	3,420 Howell Woods, Pine Level, Town Commons Park, Smithfield Recreation etc.	457 San Lee, Sloan, Horton, Buchanan Parks, etc.	5,763 University Lake, Lake Michael, Little River Park, Blackwood Farm, Seven Mile Creek Park, etc.	22,083 Little River, Crabtree Creek, Mark's Creek, Lake Johnson, Shearon Harris Park, Lake Wheeler, Lake Johnson etc.	35,867
Non-Profits	3,479 TLC lands and other easements	1,653 TLC lands, Eno River Association, Ellerbe Creek Watershed Association	1,435 TLC Lands	431 TLC Lands	6,828 TLC Lands, Eno River Association, Botanical Garden Foundation, etc.	588 TLC Lands, Smoky Mountain Nation Land Trust, North American Land Trust, etc.	14,414
Universities	0	1,552 Duke Forest	0	0	5,072 Duke Forest	309 Schenck Memorial Forest	6,933
Total	50,093	36,113	10,448	1,744	23,121	54,592	176,111

Source: GIS Analysis by Katherine Hebert

Figure 3 Triangle Region's Conservation Lands



Map by: Katherine Hebert

State Funding for Conservation in the Triangle Region

The following is an overview of the major state funding sources for land acquisition, farmland preservation, and clean water management including the Clean Water Management Trust Fund, Natural Heritage Trust Fund, Farmland Preservation Trust Fund, Parks and Recreation Trust Fund, Conservation Tax Credit Program, and Ecosystem Enhancement Program.

Clean Water Management Trust Fund (CWMTF)

Established in 1996, the goal of the Clean Water Management Trust Fund is to combat water pollution. Funding for CWMTF is provided by 6.5% of the unreserved credit balance in the NC general fund at the end of each fiscal year, with a minimum amount of \$30 million being contributed every year (Trust for Public Lands, 2010). Grants are awarded to local governments, state agencies, and conservation non-profits twice a year to clean up polluted water, protect unpolluted water, or acquire land or easements.

As of 2008, CWMTF has invested more than \$506.3 million in land and water conservation efforts to preserve over 454,944 acres of land including 4,859 miles of riparian buffers within North Carolina (Clean Water, 2008). According to the fund's project listings, \$74.4 million has gone to counties within the Triangle Region as of November 2009.

North Carolina Natural Heritage Trust Fund (NHTF)

The General Assembly established the Natural Heritage Trust Fund in 1987 "to acquire and protect the state's ecological diversity and cultural heritage and to inventory the natural areas of the state" (Trust for Public Lands, 2010). The initial appropriation was \$275,000 and additional funds come from a portion of the sale of personalized license plates, 15% of real estate deed transfer taxes, and accumulated interest. The grant program is operated by the Division of Parks and Recreation and grants are distributed to several state agencies and programs to acquire land for recreation or the preservation of lands with cultural, environmental, or historic resources.

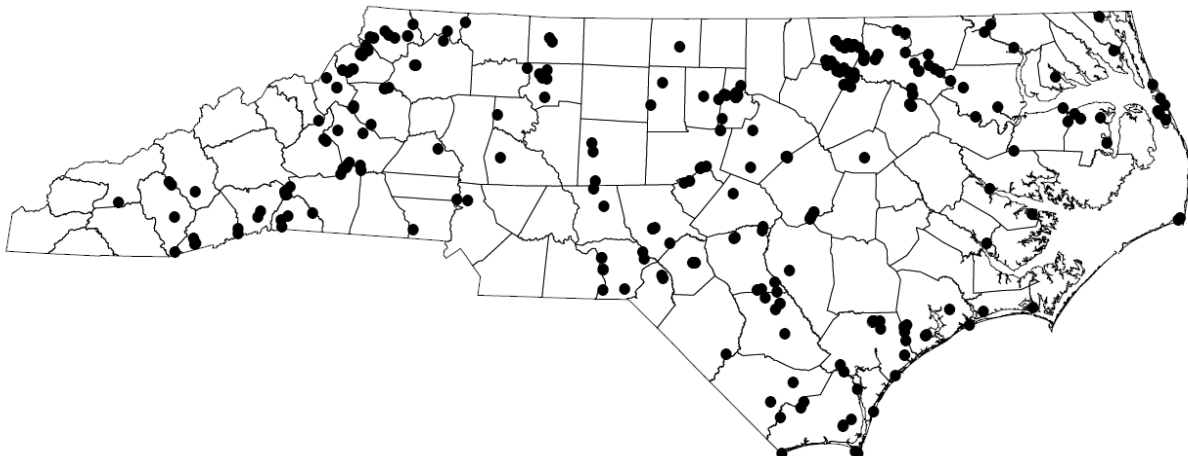
Between 1987 and December 2008, the NHTF contributed over \$300 million in funding to protect 286,534 acres (Natural Heritage, 2008). Projects within the Triangle can be found in the fund's projects awarded reports for the years between 2006 and 2008 and include the award of:

- \$82,250 to protect rare plant species within the Eno River Diabase-Pickett and Arrington Tracts in Durham, Spring 2008
- \$370,000 for bald eagle habitat in the North Carolina State University New Hope Valley Forest in Durham and Chatham, Spring 2007 and an additional \$1,827,370 in Fall 2007
- \$904,650 to acquire additional land in the Hebron Road Plant Conservation Preserve in Durham, Spring 2006 and an additional \$625,000 Fall 2007

- \$400,000 for historic preservation at the Stagville State Historic Site in Durham in Fall 2007
- \$409,000 for acquisition of land for the Deep River State Trail in Lee, Fall 2007
- \$326,450 for acquisition of land for Penny's Bend/ Eno River Diabase Sill in Durham, Spring 2006
- \$115,000 for the Bentonville Battlefield Preservation in Johnston, Spring 2006

The map below shows that every county within the Triangle Region has received funding from the fund at some time in the fund's history.

Figure 4 Natural Heritage Trust Fund Project Locations 1988-2007



Source: Natural Heritage Trust Fund, 2007

Farmland Preservation Trust Fund

After being ranked second in the nation for the rate of converting farmland to developed areas, the General Assembly developed the Farmland Preservation Trust Fund originally in the Department of Agriculture and Consumer Services. Later in 1999 it was contracted out to the Conservation Trust for North Carolina. The program receives funds through appropriations and grants are distributed to local governments and non-profits to purchase agricultural conservation easements as well as to fund program development, education and promotion, and administration (Trust for Public Lands, 2010).

In the 2008-2009 Grant Cycle, the Triangle Region received the following:

- Chatham County received \$35,000 to develop a Farmland Preservation Plan
- Durham County received \$398,000 for an easement for the Tilley property

- Durham Soil and Water Conservation District received \$30,000 for an Agricultural Development and Farmland Protection Plan
- Johnston County received \$31,500 to develop an Agricultural Plan
- Orange County received \$132,000 for agricultural development- regional share value added kitchen and food processing center
- Triangle Land Conservancy \$664,300 for an easement for Chestnut Hill Farm (Agricultural Development, 2008).

North Carolina Parks and Recreation Trust Fund (PARTF)

The Parks and Recreation Trust Fund was created by the General Assembly in 1994, to improve the quality of life in North Carolina through preservation of natural resources and development of public park and recreation facilities. The fund is managed by the Department of Parks and Recreation and funded by the state real estate deed transfer tax, receiving 75 percent of that revenue. Sixty-five percent of the fund goes into the State Parks System. Thirty percent matches money spent by local governments on parks and recreation up to \$250,000. The remaining five percent helps fund the Public Beach and Coastal Waterfront Access Program (Trust for Public Lands, 2007). The Triangle Region has received a total of \$15,010,352 from this fund since 1998(Parks, 2010).

Table 4 Parks and Recreation Trust Fund Local Grants, 1997-2008

County	Grant Funding
Chatham	\$1,541,541
Durham	\$700,695
Johnston	\$2,801,822
Lee	\$802,375
Orange	\$1,531,500
Wake	\$7,632,419
	\$15,010,352

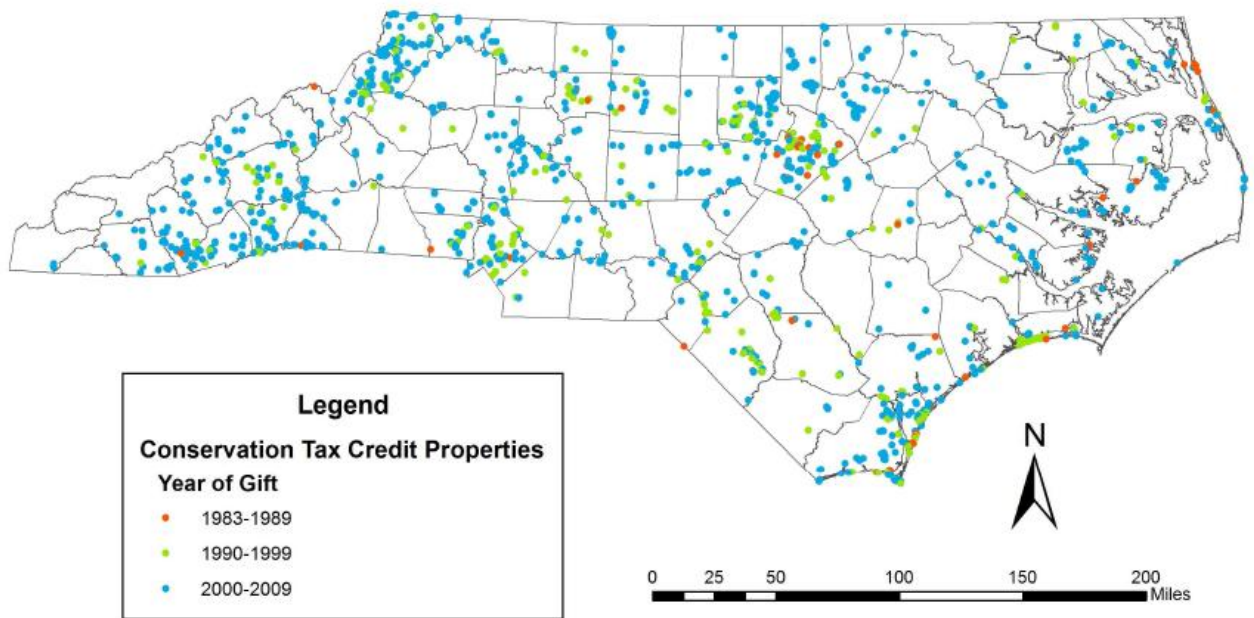
Source: Parks, 2010

North Carolina Conservation Tax Credit Program

Established in 1983, The North Carolina Conservation Tax Credit Program is the nation's first tax credit to encourage private donation of land for conservation purposes. The way the program works is that “an individual corporation that donates property or development rights to a qualified recipient receives a tax credit of 25% of the value of that property. There is a maximum tax credit of \$250,000 for individuals and \$500,000 for corporations that can be used to reduce or eliminate state income tax and can be carried over for up to five years”(Trust for Public Lands, 2007).

Since 1983, the North Carolina Conservation Tax Credit Program has been used to conserve 11,613 acres of land within the Triangle Region (Pohlman, 2010). Approximately 201,000 acres have been conserved across the state since 1983, with 13,000 acres being conserved during the 2008 to 2009 fiscal year (Conservation Easement Program, 2009). Although the tax credits distributed through this program reduces state revenue by \$15 to \$25 million every year, over the last five years the state has been able to use this program to leverage donations valued between \$80 and \$195 million per year- a significant savings to the state.

Figure 5 North Carolina Conservation Tax Credit October 2009



Source: Conservation Easement Program, 2009

Ecosystem Enhancement Program

The Ecosystem Enhancement Program incorporated the functions of the Wetlands Restoration Program established in 1997 with the goal “to improve watershed functions through the development of plans and projects in advance of environmental impacts from transportation and economic-development improvements” (Ecosystem Enhancement, 2010).

Table 5 Properties Acquired with Ecosystem Enhancement Program Funds 1999-2003

County	Site Name	Type of Acquirement and Acreage	Watershed and Linear Feet	Date Acquired
Chatham	Mine Site	Easement- 38.4	Cape Fear	10/23/2002
Durham	Sandy Creek	Easement- 10.39	Cape Fear-3,000	10/23/2001
	Stillhouse Creek	Easement-2.8	Neuse-1,200	11/1/2001
	Forest Hills	Easement- 5.5	Cape Fear- 3,000	5/1/2002
	Ellerbee Creek	Easement-2.9	Neuse-2,500	5/2/2002
Johnston	Howell Woods	Easement- 139.86	Neuse	2/8/2002
Lee	Moncure Site	Easement-13.5	Cape Fear	5/30/2002
Wake	Chavis Park	MOU-4.6	Neuse- 2,500	2/15/1999
	Smith Austin Creek	Fee Simple-33.42	Neuse-9,500	9/8/2001
	Bertie Creek	MOU-2.2	Neuse-1,200	12/6/2001
	Little Beaver Creek	Easement-40.9	Cape Fear-5,000	3/15/2002
	Prestonwood G.C.	MOU-3.4	Neuse-3,000	7/1/2002
	Wake Fores C.C.	Easement-3.9	Neuse-3,400	7/18/2002
	Richland Creek	Easement-0.5	Neuse-300	8/12/2002
	Little Beaver Creek	Easement-7.5	Cape Fear-5,000	10/2/2002
	Chavis Branch	Easement-4.63	Neuse	2/10/2003
	Bushy Branch	Easement-2.9	Neuse	2/10/2003

Source: Ecosystem Enhancement, 2003

Triangle Regional Open Space Planning Efforts

Over the last decade, there have been four key regional open space planning activities and reports: the *Triangle Green Space Database User Manual* (2002), the *Triangle GreenPrint Regional Open Space Assessment* (2002), the *Triangle GreenPrint Progress Report* (2005), and the *State of Open Space 2002*.

The *Triangle Green Space Database User Manual* (2002) was developed by the Triangle J Council of Governments and the N.C. Center for Geographic Information and Analysis in order to guide the development of a regional green space database (TJCOG, 2002). This database was to be developed in coordination with the N.C. Million Acre Initiative and the N.C. Farmland Preservation Trust Fund to assist them with tracking each program's progress towards achieving its goals. The database was actually set up to be a set of five linked databases addressing: protected lands, adopted plans, regional GreenPrint, trails, and unprotected lands but only the database for the GreenPrint was developed.

Although the *Triangle Green Space Database* was a good start to addressing regional data collection and served as a good model for this study, there are some weaknesses to this program. Perhaps the greatest weakness is the complicated nature of the database- simply put the database requests too much information from municipalities. Other weaknesses include the lack of continuous funding to update and maintain the database and the expectation of municipalities to submit answers to 23 attributes just for the protected lands database.

The purpose of the *Triangle GreenPrint Regional Open Space Assessment* was to identify important green spaces in the region using the database described earlier (TJCOG, 2005). The report includes a series of maps that show where open spaces are located and how they are connected with each other. It also describes ways that the open spaces could be ranked and created a regional open space *vision*. The assessment was not intended to be a plan- it never identified specific tracts of land or recommend particular protection strategies.

However, the GreenPrint Assessment did accomplish 6 key steps:

1. Brought over 140 professionals and citizens together to discuss open space issues and record the general location of open space areas on the regional level.
2. It established six types of open space: parks, greenways, historic areas, natural areas, water quality areas, and farm and forest land.
3. Identified criteria that could be used to prioritize land based on open space resource value.
4. Developed initial maps and lists of key resources for each type of open space.
5. Defended the value of a regional perspective in open space preservation and started fitting all the pieces together to develop a regional vision.
6. Considered the next steps to continue the GreenPrint Process.

Part of the next steps identified by the GreenPrint Assessment was the *Triangle GreenPrint Progress Report* prepared by the Triangle J Council of Governments in 2005. The purpose of the progress report was to analyze the vision established within the initial GreenPrint Assessment and consider what actions and financial investments would be needed to implement this vision (TJCOG, 2005). The Progress Report determined the number of acres necessary to protect the backbone of the proposed system of open space to be about 6,300 acres per year. Using this number it found that the region would need to double its current rate of protection- during the 2.5 year period between July 2002 and December 2004, only 7,000 acres were protected within the six-county area.

The *Triangle GreenPrint Progress Report* also performed an extensive cost analysis to determine the cost of two scenarios of land conservation. If conservation efforts were doubled now (in 2005) for over the next 25 years, it would cost \$5.2 billion to protect the 6,3000 acres per year (TJCOG, 2005). If the rate was *not* doubled and it took 56 years then it would cost \$22.6 billion. The progress report also discussed the available local government green space plans and funding trends (past funding from 2004 to 2005 and expected appropriations up until 2007).

The previous three reports were developed through a partnership of the Triangle J Council of Governments, the Triangle Land Conservancy, and the North Carolina Department of Environment and Natural Resources. The fourth report, the *State of Open Space 2002*, was developed by the Triangle Land Conservancy in order to examine land use changes within the region, inventory land that has been protected, review non-profit and government initiatives, and recommend ways that the region can protect more land more effectively (Costa, 2002).

In addition to past regional open space planning projects, there is a current regional planning initiative that warrants mention in this report. Reality Check, which is regional program being led by Triangle Tomorrow and the Urban Land Institute, is working with the 15 counties within the broader Triangle region to promote the development of transit-oriented corridors, vibrant community centers, and additional open space protection (Triangle Tomorrow, 2009). The main goal of the Reality Check process is to develop a regional vision that will build consensus related to growth issues and help the Triangle continue to grow well and remain competitive in a global economy.

Regional Open Space Resources

Regional open space resources are those that span over two or more counties, offer a vast amount of recreational opportunities, and are usually managed through multiple partnerships or state agencies. The majority of them are preservation efforts that have taken place along water bodies such as lakes and rivers to protect water quality or prevent flooding.

B. Everett Jordan Lake- Spanning parts of Chatham, Durham, Orange, and Wake counties, Jordan Lake and its managed lands consist of 46,768 acres (DeHart, 2007). These lands are managed by multiple state agencies including the U.S. Army Corps of Engineers, N.C. Division of Parks and Recreation, N.C. Division of Forest Resources, N.C. Wildlife Resources Commission, and the Triangle Rails to Trails Conservancy. Due to multiple management agencies and the extensive span of the Jordan Lake lands, the management area has been subdivided into multiple recreation areas including: Poe's Ridge, Ebenezer Church, New Hope Overlook and Game Lands, Seaforth, Vista Point, and the Jordan Lake Educational Forest. In addition to providing flood protection, Jordan Lake offers many recreational opportunities (hiking, boating, fishing, swimming, and camping) and serves as a major water source for the region.

Falls Lake- Similar to Jordan Lake, Falls Lake is an Army Corps of Engineers project that provides flood relief and is also a major source of water for Raleigh. The lake consists of 11,620 acres and is surrounded by 27,266 acres of land in Durham, Wake, and Granville counties (DeHart, 2007). The lake is divided into 12 public-use areas, of which seven are part of the Falls Lake State Recreation Area managed by the N.C. Division of Parks and Recreation. Falls Lake Trail, which consists of more than 35 miles of hiking trails and is part of the Mountains to Sea Trail, passes through game lands and connects the Rolling View, Blue Jay Point Park, and Shinleaf recreation areas.

Eno River State Park- Located in Durham and Orange counties, Eno River State Park spans from Hillsborough to Durham and covers 2,738 acres of land and water (DeHart, 2007). The park is divided into four sections- Few's Ford, Cabe Lands, Cole Mill Road, and Pump Station- and offers over 24 miles of trails and 12 river miles for paddling. The park is a good place to see wildflowers, river birch, sycamores, and sweet gum trees as well as the remnants of pioneer settlement along the river.

Little River Regional Park and Natural Area- A joint effort between the Triangle Land Conservancy, the N.C. Parks and Recreation Trust Fund, the Land and Water Conservation Fund, the N.C. Water Management Trust, and the Eno River Association made this 376-acre preserve possible (DeHart, 2007). The preserve has both historic and natural significance

protecting historic places used by Native American and pioneer farmers as well as rare mussel and fish species.

Deep River- The Deep River provides habitat for the endangered Cape Fear shiner, a small golden minnow. The riverbanks are lined with white pine trees and the remains of a failed river navigation system including a lock, dam and canal at Lockwood. The Deep River is an important water supply for Chatham and Lee counties and is currently threatened by increased levels of nutrients and sedimentation entering the river via its tributaries. Because of its natural and historic significance, the Triangle Land Conservancy is working to protect 4,040 acres on the Deep River including the expansion of the White Pines Nature Preserve, Endor Iron Furnance, WRC Gameland, and conservation efforts along Lockville, Patterson Creek, and Popular Creek (TLC Deep River, 2009).

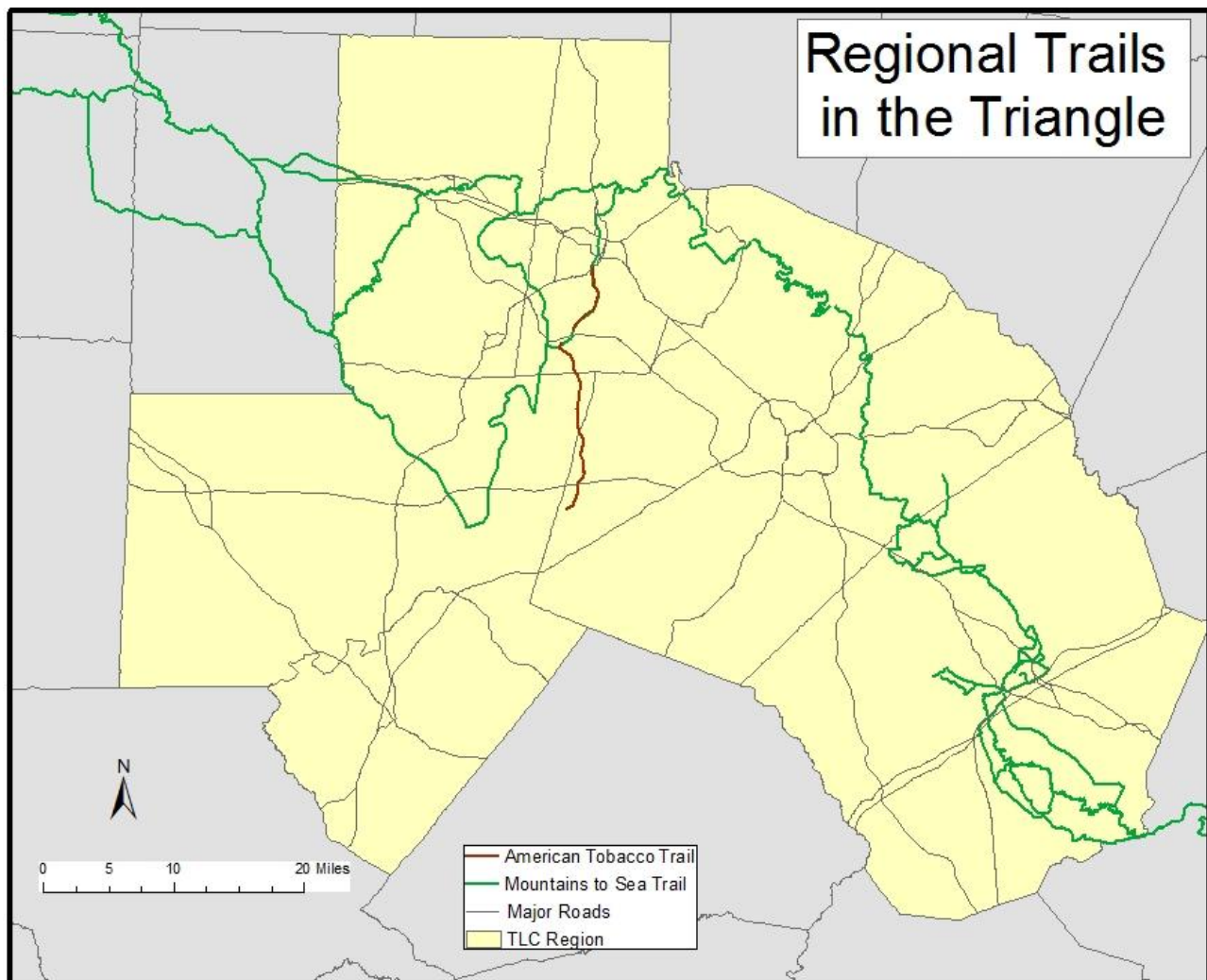
Mark's Creek- Named a Last Chance Landscape by *Scenic America* in 2003, Mark's Creek is a significant area for historic and open space preservation. Consisting of 7,500 acres, this undeveloped area has great potential to become a natural park larger than Umstead State Park. Only 10 miles from Raleigh, Mark's Creek features historic homes and farms, country stores, ponds, wetlands, forests and rural churches including the 19th century Oak Grove Methodist Church. The expansion of highways near this undeveloped area threatens rapid urbanization if action is not taken soon. Therefore it is considered a priority area for the Triangle Land Conservancy, which is actively working to protect 1,685 acres in the area (TLC Mark's Creek, 2009).

New Hope Creek- As a primary tributary of Jordan Lake, New Hope Creek starts north of Chapel Hill, passes through Duke Forest, and meanders into Durham. The riverbanks on either side of New Hope Creek provide some of the most important wildlife habitats in the Triangle and is home to hundreds of plant and animal species that are quickly disappearing from the region (TLC New Hope, 2009). Because of its location between Chapel Hill and Durham and along Johnston Mill Nature Preserve, Duke Forest and Githens Middle School, New Hope Creek is a popular place for hikers and nature explorers (TLC New Hope, 2009). The Triangle Land Conservancy is actively working to protect 28 acres on New Hope Creek that would include Hollow Rock Trailhead and the Steep Bottom Branch.

Duke Forest- This forest, managed for research and teaching purposes at Duke University since the early 1930s, consists of 7,060 acres in Alamance, Durham and Orange counties. Duke Forest has six divisions that offer a variety of ecosystems, forest cover types, plant species, soils, topography and past land use conditions. According to Duke's website; "in terms of size, diversity, accessibility and accumulated long-term data, the Duke Forest is a resource for studies related to forest ecosystems and the environment that is unrivaled at any other university" (Duke Forest, 2010).

Regional Trails- The Triangle is also working to expand two regional trails. The American Tobacco Trail is a 22 mile rails-to-trails project connecting the City of Durham, Durham, Chatham, and Wake Counties, the jurisdictions of Cary and Apex and Jordan Lake lands (Triangle Rails-to-Trails, 2008). The Mountains to Sea Trail is a 935 mile trail consisting of footpaths, roads, and state bike routes across the state. The trail started in 1973, and passes through Orange, Durham, Wake, and Johnston counties (Friends, 2009).

Figure 6 Regional Trails in the Triangle

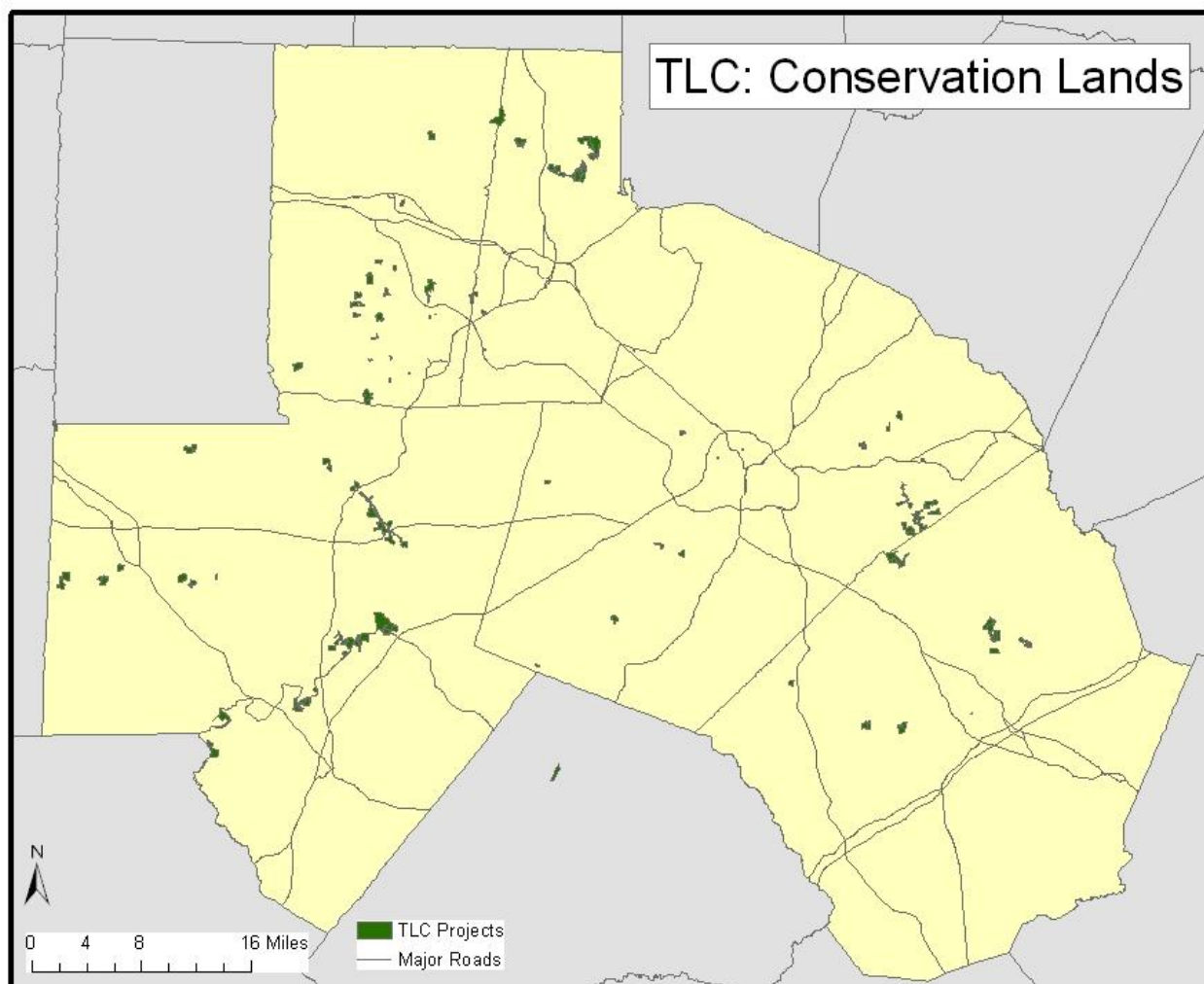


Map by: Katherine Hebert

Triangle Land Conservancy Lands

The Triangle Land Conservancy has worked with its partners to conserve over 13,111 acres of land valued at over \$61 million as part of the 138 projects throughout the six counties it represents. Founded in 1983, the Conservancy's mission is "to protect important open space- stream corridors, forests, wildlife habitat, farmland and natural areas- in Chatham, Durham, Johnston, Lee, Orange and Wake counties to help keep our region a healthy and vibrant place to live and work"(About TLC, 2009). TLC has identified five priority areas- New Hope Creek, Deep River, Neuse River Lowlands, Little River, and Mark's Creek- and three special project areas- Haw River, Upper Neuse Clean Water Initiative, and the Chatham County Working Lands Initiative. In addition to acquiring properties, TLC provides stewardship on all the property it manages and is a leader in conservation planning for the region. As a land trust, TLC offers landowners many ways to protect their land in the face of ever-growing development pressure in order to help communities save their natural heritage. A complete table of TLC properties can be found in Appendix: III.

Figure 7 Triangle Land Conservancy Conservation Lands



County-by-County Assessment of Open Space Conservation

The following section details a county-by-county assessment of open space conservation efforts³. It is interesting to note that the 2002 *State of Open Space* report recognized an “urban-rural divide” in land conservation within the Triangle, with far more land being protected in the more urban areas than in the rural areas (Costa, 2002). This notion was reinforced by study participants, especially those in rural areas that often referenced a lack of funding (mainly bonds), staff support, or even an open space or recreation department as being major challenges they must overcome. Another aspect of open space preservation that many of the more rural areas (Orange, Johnston, Chatham, and Lee counties) are facing is the inability of citizens to visualize the effects that an increasing level of urbanization will have on their county in the next 30 or 50 years. It is difficult to sell the idea that open space needs to be protected now, when open space in the shape of farms and woodlands seem to be everywhere in these counties.

Fortunately, both Chatham County and Johnston County have recently received funding from the Farmland Preservation Trust Fund to develop agricultural preservation plans. Two other tools that are widely being used within these counties are an open space ordinance and stormwater management programs. The more rural counties are also making great strides in connecting to regional trail systems including the American Tobacco Trail and the Mountain to Sea Trail. As the more urbanized counties of Wake and Durham start to run out of large parcels of land to conserve and as land prices within these counties increase, additional land acquisitions outside of county boundaries is likely to occur. The situation is ripe for increased regional collaboration and partnerships to help decrease this divide.

³ The maps in the County by County section were made using the Open Space and Conservation Lands shapefiles from One NC Naturally and road files, park files, and open space files, from each county’s website. Although each of these sites make every attempt to have the files gathered from private and public offices as accurate and as up to date as possible, they maintain no legal responsibility for the information found on their websites.

Wake County

Acres Conserved: 45,646 (Falls Lake 6,512 Acres)

Percent of County Conserved: 8.3%

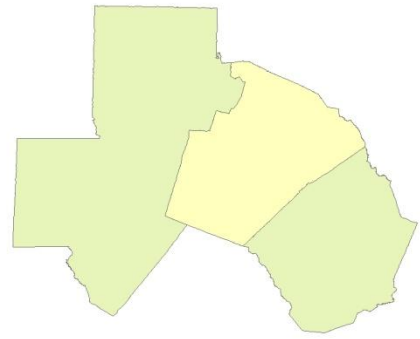
Per Capita Conservation: 0.37 acre/person

Funding Since 2002: \$81M

Main Office: Wake County Parks, Recreation, &
Open Space

Highlights from Plans:

- Defines open space as protected lands and waters that are owned and managed by the County or its partners. Open space is any parcel of area of land and water that is essentially unimproved and devoted to (1) the preservation of natural resources and habitat; (2) the managed production of resources (forest and farm land); (3) outdoor recreation; (4) preservation of historic and cultural property; (5) protection of scenic landscapes; and (6) protection of public health, safety, and welfare.
- Establishes a program with four major components: (1) Identifying key parcels of land and corridors to protect; (2) Recommending new regulatory programs to improve the protection of resources that safeguard public health, safety, and welfare; (3) Establishing a new program of land stewardship; (4) Defining recurring sources of revenue that support conservation.
- Estimates that 78% of the county land area will be developed by 2020 if conservation efforts are not increased dramatically.
- Received \$41 million through referendums in 2000 and 2004 for open space preservation.
- Identifies water quality, ecological values, economic values, connectivity, and sense of place as the benefits of open space protection and the plans focus areas.
- Wake County Consolidated Open Space Plan contains plans from 11 individual municipalities.



County Statistics and Plans:

Area:

- Total- 857 sq mi
- Land- 832 sq mi
- Water- 25 sq mi

Population:

- 2008 Estimate- 829,218
- Population Density- 997/sq mi

Plans:

- Comprehensive Parks and Recreation Master Plan
- Wake County Consolidated Open Space Plan
- Trails and Greenways of Wake County, Pocket Guide and Community Resource
- Wake County Land Use Plan
- Wake County Growth Management Strategy

Major Open Space:

William B. Umstead State Park- Described as a “valuable oasis in the center of a fast-developing metropolitan area,” Umstead Park covers 5,480 acres and is one of the state’s largest parks (DeHart, 2007). Situated next to Raleigh-Durham International Airport, U.S. 70 and I-40, Umstead started as a Civilian Conservation Corps camp in the 1930s. Reedy Creek initially served as a divide between the African American Reedy Creek State Park and the Caucasian Crabtree Creek State Park that were joined in 1966 as Umstead Park. The park contains some of the oldest trees in the state with large mature stands of oaks, yellow poplars, sycamores, loblolly pines, and an understory of dogwoods, redbuds, mountain laurel, and sourwood. Parts of the park are listed on the National Registry of Natural Landmarks and serve as critical habitat for specie protection. With over 35 miles of hiking and mix use trails, Umstead is a critical recreation area for Wake County.

Hemlock Bluffs Nature Preserve- Named after the eastern hemlock, a conifer not usually found farther east than Hanging Rock State Park, this 150-acre preserve has over 200 of these evergreens (DeHart, 2007). The conditions found within the preserve are similar to those found in the Appalachian Mountains with cool, damp, north-facing bluffs with hemlock, yellow orchids, trillium, and chestnut oak. The preserve has an educational center and 2.1 miles of trail.

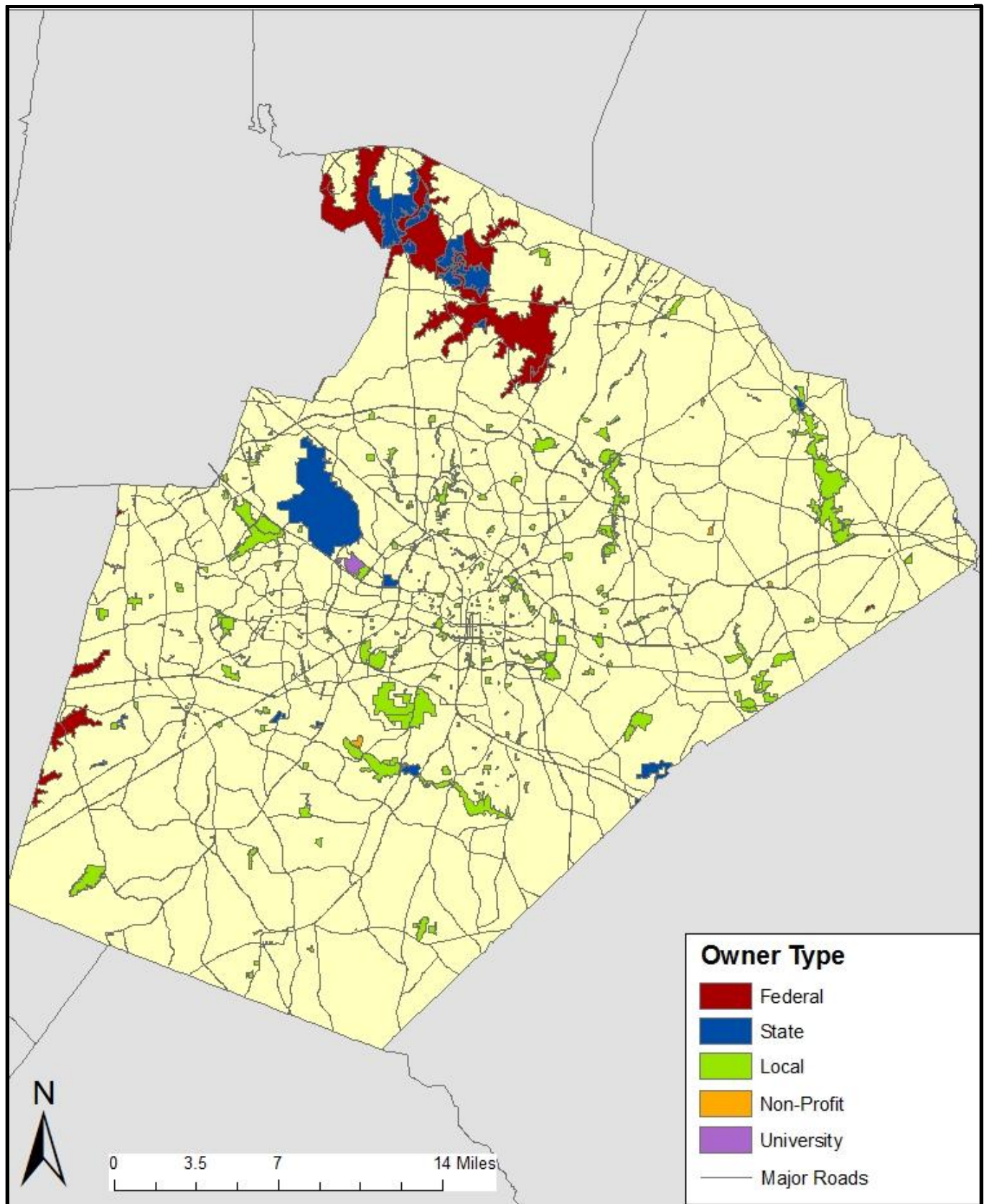


Source: North Carolina Parks



Source: Hemlock Bluffs Nature Preserve

Figure 8 Wake County Open Space



Durham County

Acres Conserved: 34,705 (Falls Lake 4,827 Acres;
Jordan Lake 124 Acres)

Percent of County Conserved: 37.5%

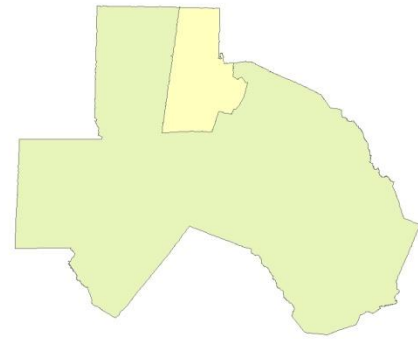
Per Capita Conservation: 0.27 acre/person

Funding Since 2002: \$11M

Main Office: Durham Open Space and
Real Estate Division

Highlights from Plans:

- Determines a level of service standards for open space protection in the City and County.
- Recommends planning to interconnect open spaces, identify areas for protection, and guide park development.
- Proposes developing a plan for Eastern Durham (which has been completed) and urban open space protection efforts (which is currently being worked on).
- Promotes collaboration with local land trusts and other community organizations to increase the amount of open space protection and develop an open space coordinating group.
- The county designates agricultural priority areas, has a voluntary agricultural districts program, and purchase farmland conservation easements.
- Sets requirements for new residential development to provide recreation facilities and recreation impact fees.
- Identifies open space areas within the future land use map including the 100-year floodplains, US Army Corps of Engineers land, Eno River State Park, Duke Forest, NCSU Hill Forest, Lake Crabtree lands, Lake Michie, Little River Reservoir, New Hope Corridor, and parks, privately-owned conservation lands, abandoned railroad corridors and historic sites.



County Statistics and Plans:

Area:

- Total- 298 sq mi
- Land- 290 sq mi
- Water- 7 sq mi

Population:

- 2008 Estimate- 262,715
- Population Density- 769/sq mi

Plans:

- Durham Comprehensive Plan
- New Hope Corridor Open Space Master Plan
- Eastern Durham Open Space Plan
- Little River Corridor Open Space Plan
- Durham Trails and Greenways Master Plan

Major Open Spaces:

Hill Demonstration Forest- Spanning both sides of the Flat River, the 2,400 acre Hill Forest is owned and managed by North Carolina State University as a forest research laboratory (DeHart, 2007). Permission to access the forest's four trails is required.

Camp Butner- The North Carolina National Guard uses this 4,750 acre reserve for training (Global Security, 2005). The camp is within Granville and Durham counties and is 15 miles away from the City of Durham. Established in 1942 and named in honor of Major General Henry Wolfe Butner, the camp originally served as a training area for combat soldiers, a military hospital, and a prisoners of war camp. At the end of World War II, the camp was closed until it was converted to a hospital for the mentally ill in 1947. The land is currently divided into the North Carolina Department of Agriculture Umstead Research Farm, a Federal Correctional Complex, and training grounds for the National Guard. The hardwood forests found within the camp provide habitat for a wide diversity of small game species.

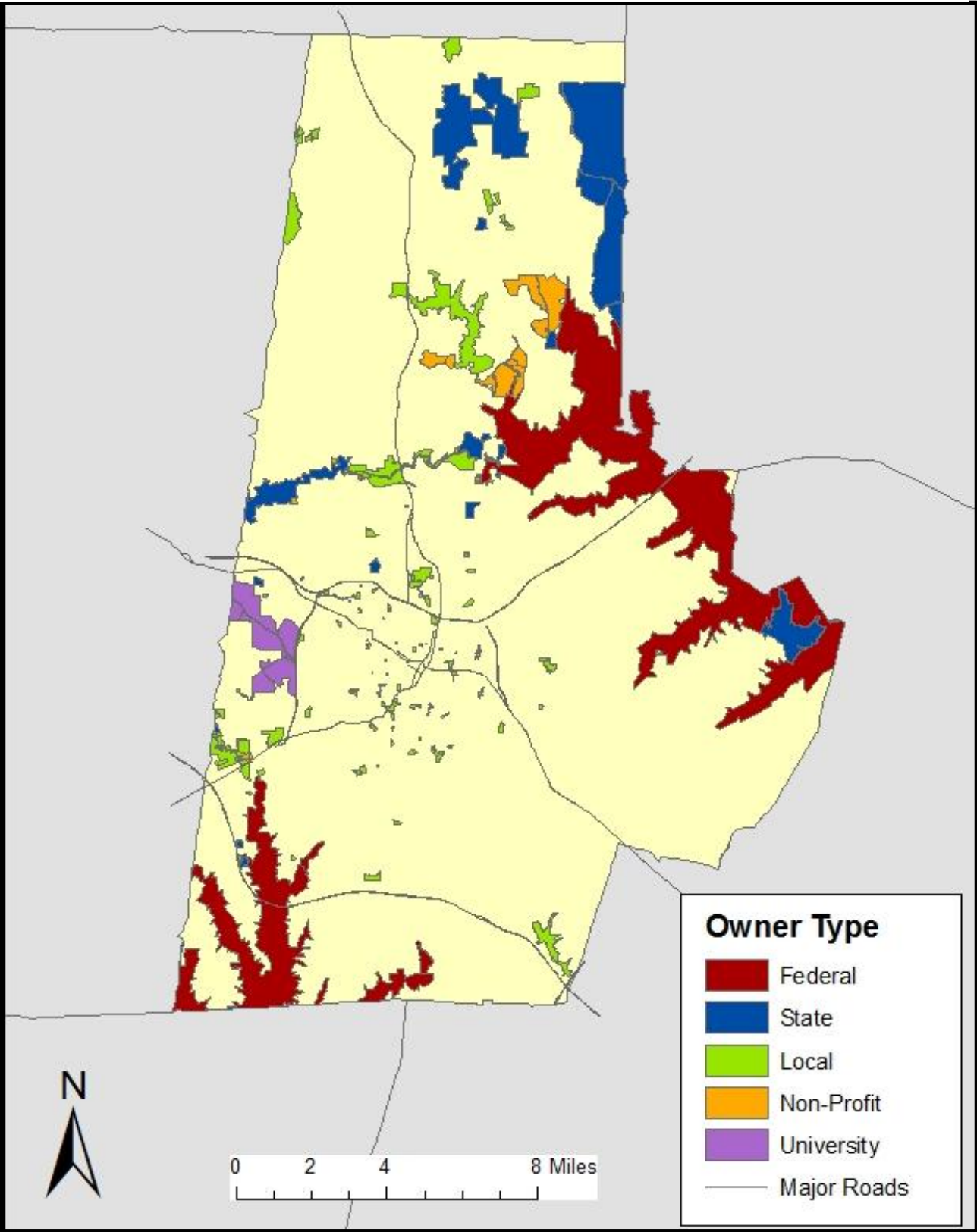


Source: Friends of Hill Forest



Source: US Army Corps of Engineers

Figure 9 Durham County Open Space



Orange County

Acres Conserved: 20,606

Percent of County Conserved: 8.0%

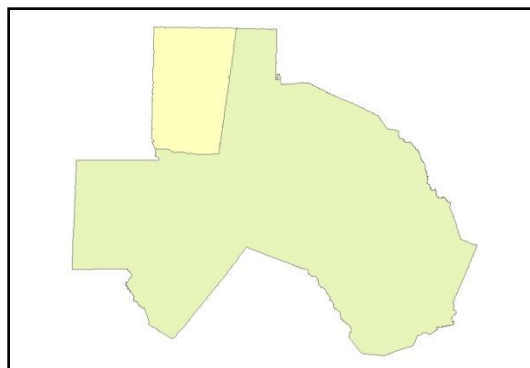
Per Capita Conservation: 0.17 acre/person

Funding Since 2002: \$14.8 M

Main Office: Environment and Resource
Conservation Department

Highlights from Plans:

- Identifies the greatest challenge to open space preservation and protecting natural areas to rapid urbanization to accommodate population growth.
- Sets goal to provide a network of protected natural, cultural, and agricultural lands.
- Encourages the county to work with regional and local organizations, the towns, and private landowners to promote and achieve preservation of important natural resources.
- Discusses the Voluntary Farmland Preservation Program and the Lands Legacy Program (the first comprehensive county land conservation program in the state).
- Includes a complete inventory of natural areas, plant and animal species, heritage sites, prime forests, and water bodies.
- Has an inter-jurisdictional recreation and park planning group for funding and planning.
- Conducted a feasibility study for the transfer of development rights and regularly prepares state of the environment reports.



County Statistics and Plans:

Area:

- Total- 401 sq mi
- Land- 400 sq mi
- Water- 1 sq mi

Population:

- 2008 Estimate- 124,168
- Population Density- 310/sq mi

Plans:

- A New Era for Parks
- Agricultural Development and Farmland Protection Plan
- A Landscape with Wildlife for Orange County
- Natural Areas and Wildlife Habitat for Orange County
- State of the Environment Report 2004
- State of the Environment Report 2009
- Strategic Growth and Rural Conservation Program
- 2030 Comprehensive Plan

Major Open Spaces:

Occoneechee Mountain State Natural Area- Consisting of 124 acres on a forested hill, the Occoneechee Mountain State Natural Area provides a buffer between Hillsborough, I-85 and the Eno River (DeHart, 2007). The elevation is only 867 feet, but many species found in the western part of the state can also be found along the 2.2 miles of trail found within the natural area.

North Carolina Botanical Gardens- Many Southeastern trees, shrubs, plants, ferns, wildflowers and herbs can be found within the 600 acre garden (DeHart, 2007). In addition to walking trails there is a recently constructed 30,000 square-foot educational building focusing on recycling.

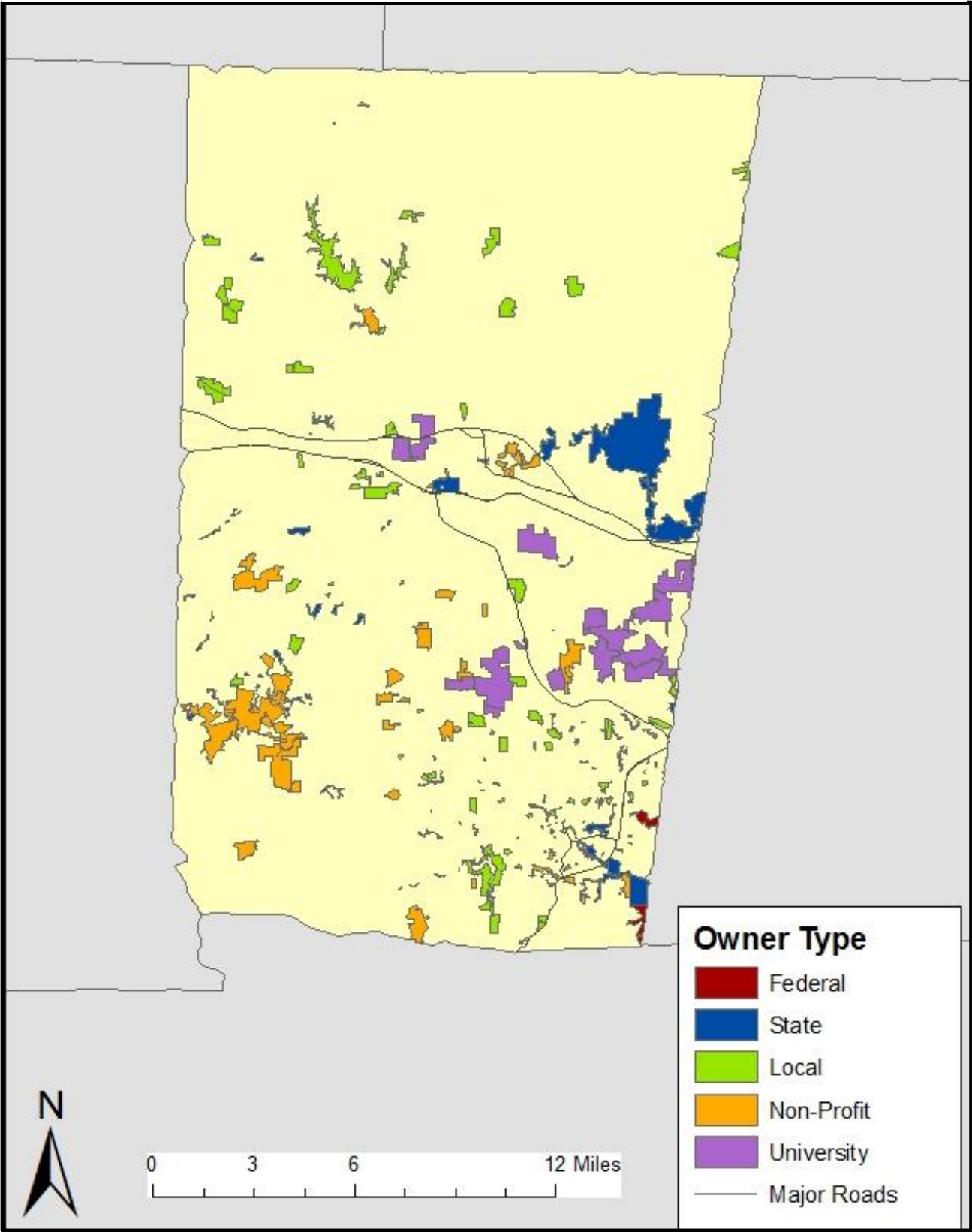


Source: North Carolina Parks



Source: NC Botanical Gardens

Figure 10 Orange County Open Space



Chatham County

Acres Conserved: 44,127 (Jordan Lake 13,064 Acres)

Percent of County Conserved: 9.7%

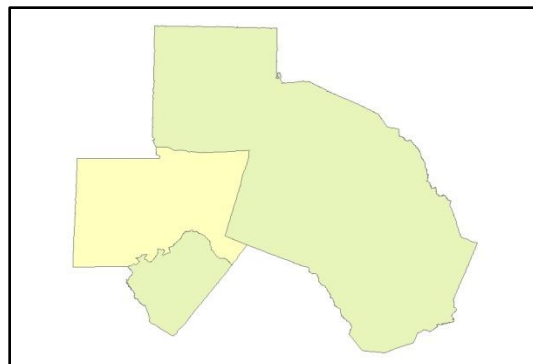
Per Capita Conservation: 0.72 acre/person

Funding Since 2002: \$2.65 M

Main Office: Parks and Recreation Department

Highlights from Plans:

- Goals to preserve rural character and develop an integrated approach to protecting and promoting high-quality open space, recreation, historic and tourism locations.
- Divides the county into seven types of places including lakes, rivers and streams; natural conservation areas, resource protection areas; and agricultural and rural development areas.
- Encourages the adoption of a minimum open space set-aside standards for conventional subdivisions or develop exaction in lieu of open space set-aside standards.
- Promote the establishment of a voluntary agricultural district program and purchase of development rights program.
- Recommends establishing a *Farms of the Future* program to provide technical assistance to farmers on marketing, infrastructure improvements, land acquisition, estate planning, and specialty farming.
- Identifies key areas such as Jordan Lake; Haw, Rocky, Cape Fear, and Deep Rivers; scenic roads such as Devil's Tramping Ground Scenic Byway; historic structures; and the White Pines and Duke Forest lands.
- Recommends the development of master plans, a schools-parks program, and a unified county board.



County Statistics and Plans:

Area:

- Total- 709 sq mi
- Land- 683 sq mi
- Water- 26 sq mi

Population:

- 2008 Estimate- 61,222
- Population Density- 90/sq mi

Plans:

- Parks and Recreation Master Plan (being updated)
- Land Conservation and Development Plan
- Inventory of the Natural Areas and Wildlife Habitats of Chatham County, NC

Major Open Spaces:

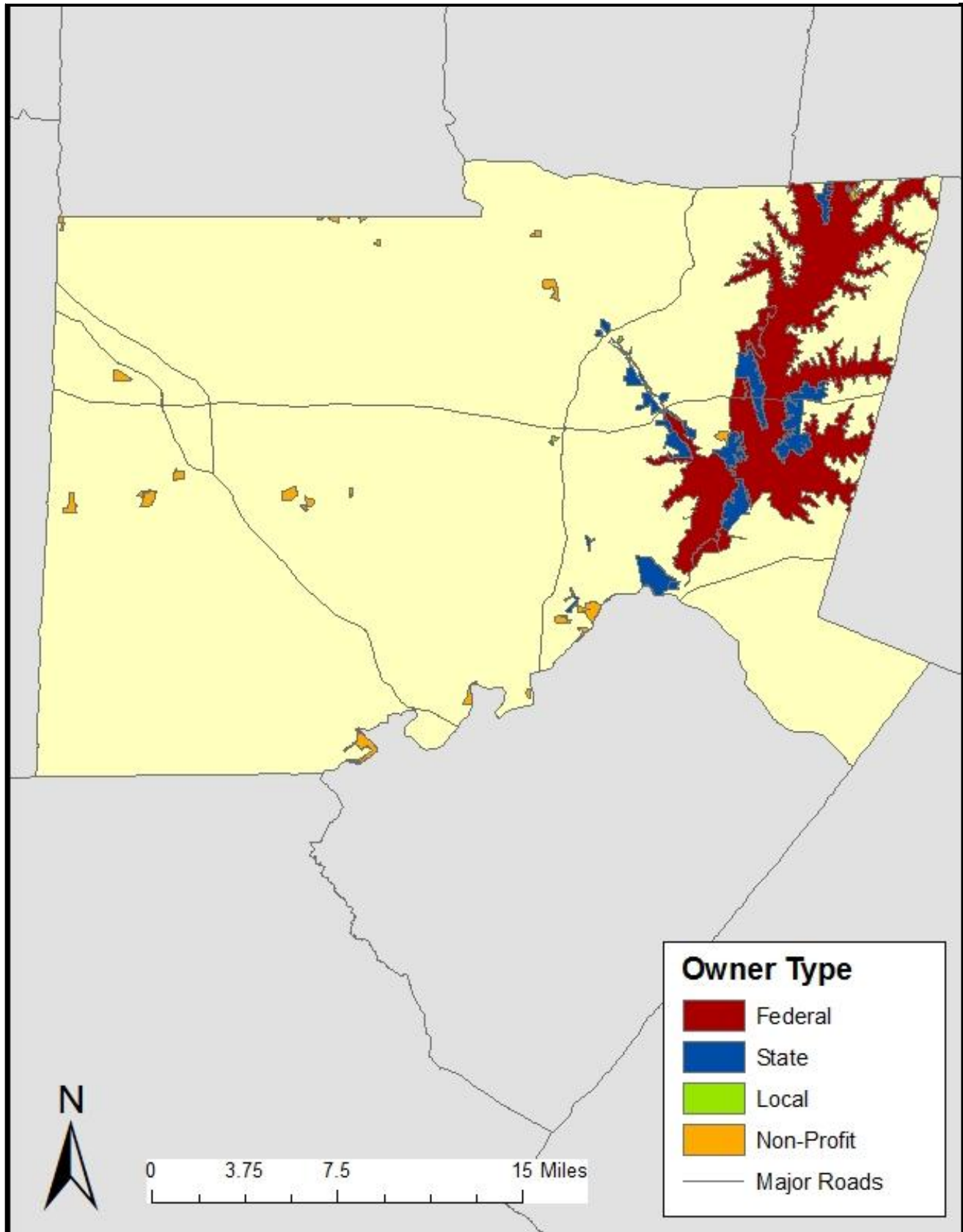
Haw River- The Haw River has been identified as a nationally significant aquatic habitat (provides habitat to the rare *Gomphus septima* or Septima's clubtail dragonfly and *Phacelia ranunculacea* also known as oceanblue phacelia, a rare wildflower) and the riverbank as natural areas of state significance. The Lower Haw State Natural Area was purchased in 2003 by the State of North Carolina from Duke University which had owned the property since 1966. The property along the Haw River is crucial to the protection of the Jordan Lake reservoir that serves as a drinking water source for many of the Triangle-area communities (TLC, Haw 2009).

Featuring a large expanse (approximately 40 acres) of mixed hardwood forest that protects 4,373 feet of Haw River frontage and provides another 1,887 feet of stream buffer protection on Brooks Branch, the Stevens tract purchased by TLC and the Haw River Assembly in 2008 abuts the Lower Haw River State Natural Area and connects the natural area to the Bynum dam (TLC Haw, 2009).



Source: Triangle Land Conservancy

Figure 11 Chatham County Open Space



Lee County

Acres Conserved: 1,723

Percent of County Conserved: 1.0%

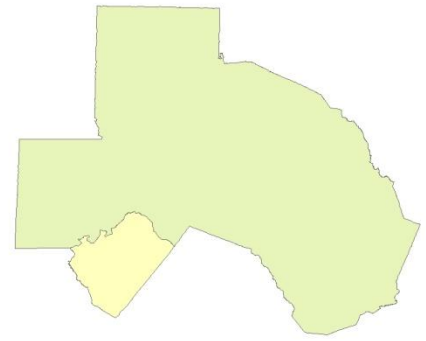
Per Capita Conservation: 0.03 acre/person

Funding Since 2002: \$0 (all land acquisitions done through donated easements)

Main Office: Department of Planning and Development

Highlights from Plans:

- Identifies providing adequate parks and recreation facilities as a significant planning goal.
- Focus is on preserving stream valleys- through limiting development in floodplains and establishing a 30 foot buffer, and developing greenways within their corridors- especially along the Deep River.
- Ties the provision of open space and recreation facilities to private development to help meet the demand for publically financed facilities.
- Envisions a large system of greenways by 2020 mainly through the acquisition of floodplains to connect schools, parks, and other community facilities.
- The Deep River Small Area Plan calls for the establishment of an Open Space Fund for the acquisition of land and conservation easements as well as further investigation of a transfer of development rights program.
- States that a policy guide for voluntary farmland preservation should be developed and a restructuring of the Unified Development Ordinance to support right to farm laws should take place.



County Statistics and Plans:

Area:

- Total- 259 sq mi
- Land- 257 sq mi
- Water- 2 sq mi

Population:

- 2008 Estimate- 57,878
- Population Density- 225/sq mi

Plans:

- Sanford and Lee County 2020 Land Use Plan
- Deep River Small Area Plan

Major Open Spaces:

San-Lee Park and Educational Center- The park consists of 125 acres of forest, lakes, camping sites, and a nature center with an amphitheater (DeHart, 2007). The park is open year round and has hiking and biking trails.

Endor Iron Furnace State Historic Site- Found near the community of Cumnock, the Endor Iron Furnace is one of the oldest and most significant structures in Lee County (Lee County, 2010). The furnace was used as a pig iron furnace from the 1860s to 1874. In 2001, it was purchased by the Triangle Land Conservancy (TLC), who later transferred the ownership of the furnace and a 426-acre surrounding property to the North Carolina Department of Cultural Resources. TLC continues to manage the property with considerable support from the Railroad House Historical Association and other local interests. Plans for the site include the development of a nature preserve and park, and the restoration of the furnace.

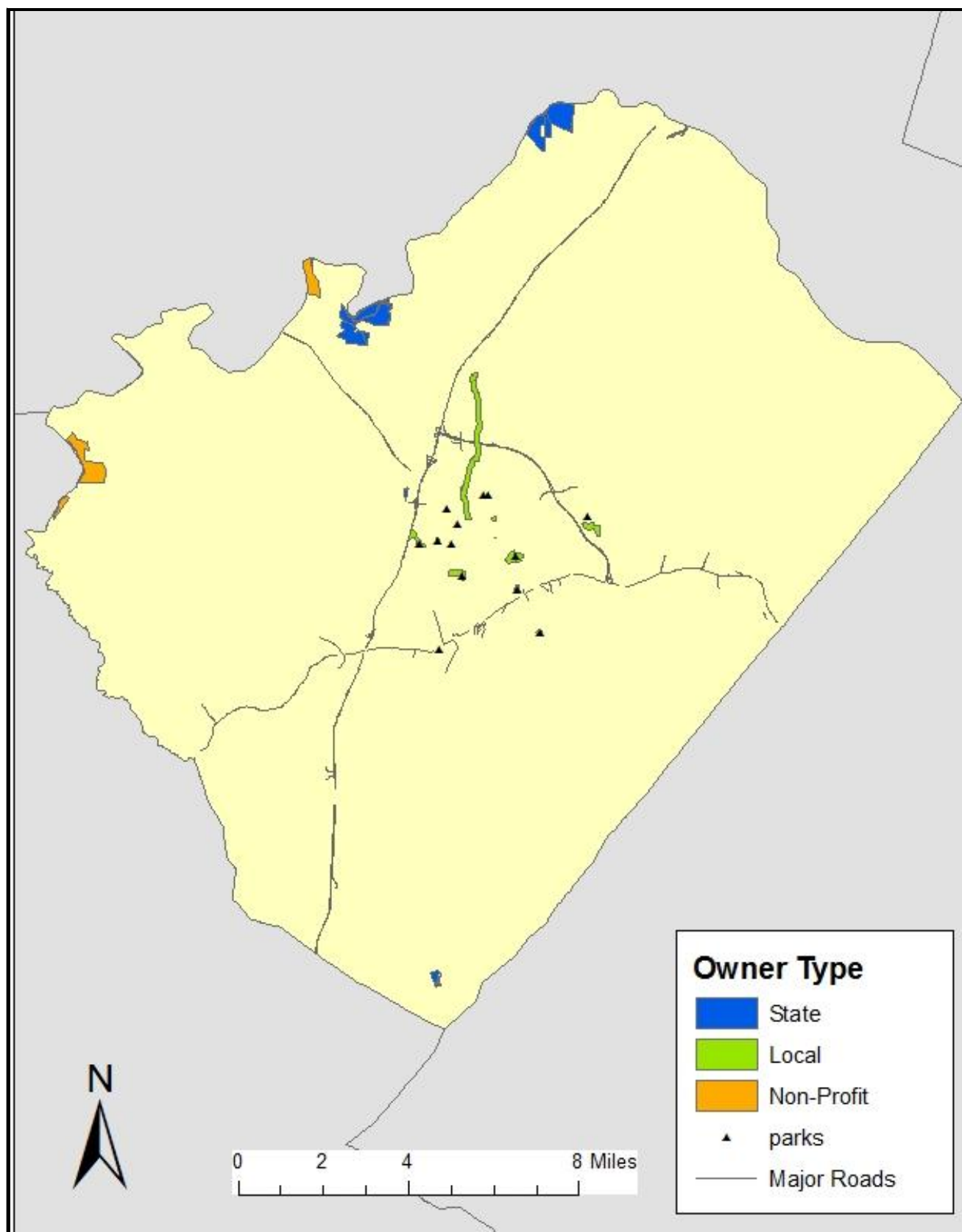


Source: Lee County- San Lee Park



Source: Railroad House Historical Association

Figure 12 Lee County Open Space



Johnston County

Acres Conserved: 8,692

Percent of County Conserved: 1.7%

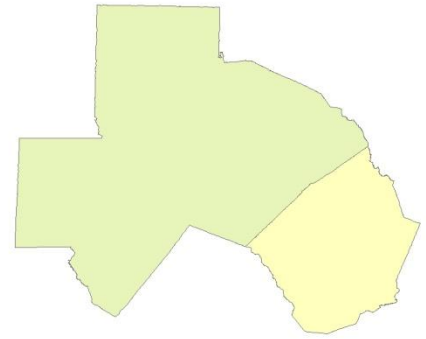
Per Capita Conservation: 0.06 acre/person

Funding Since 2002: Approximately 50,000 annually for staff services such as surveying lands, site analysis, etc.

Main Office: Planning Department

Highlights from Plans:

- Defines open space as any parcel or area of water or land that is essentially unimproved and devoted to an open space use for the purpose of (1) the preservation of natural resources; (2) the managed production of resources; (3) outdoor recreation; or (4) public health and safety.
- County has 36 state parks and 53 recreation sites as well as hiking trails that connect Clayton, Wilson Mills, Selma and Smithfield.
- Major projects include the development of a portion of the Mountains-to-Sea trail that will consist of a multi-use greenway and paddling trails and connect Smithfield to Clayton.
- Dedicated to preserving farmland and the county's rural character.
- Focused on new development and the need to set aside public green space and cluster development to conserve environmentally sensitive land- just updated their open space ordinance.
- Has the goal to provide high-quality recreational opportunities by developing an open space/recreational plan and inventorying community assets including historic sites and scenic vistas.



County Statistics and Plans:

Area:

- Total- 796 sq mi
- Land- 792 sq mi
- Water- 4 sq mi

Population:

- 2008 Estimate- 156,965
- Population Density- 198/sq mi

Plans:

- 2030 Comprehensive Plan
- Mountains-to-Sea Trail Plan

Major Open Spaces:

Howell Woods- This 2,800-acre natural preserve is a major environmental learning center for Johnston County and has a system of 15 trails for hiking, biking and horseback riding (Howell Woods, 2008). Located between the Neuse River and Hannah and Mill creeks in southeastern portion of the county, Howell Woods has unique ecosystem of hardwood forest and wetlands.

Bentonville Battlefield State Historic Site- The Battle of Bentonville, fought March 19 to March 21, 1865, was the last major Confederate offensive and the largest battle ever fought in North Carolina (DeHart, 2007). The historic site includes over 13 miles of trail including 29 stations describing the history of the battle and Harper House.

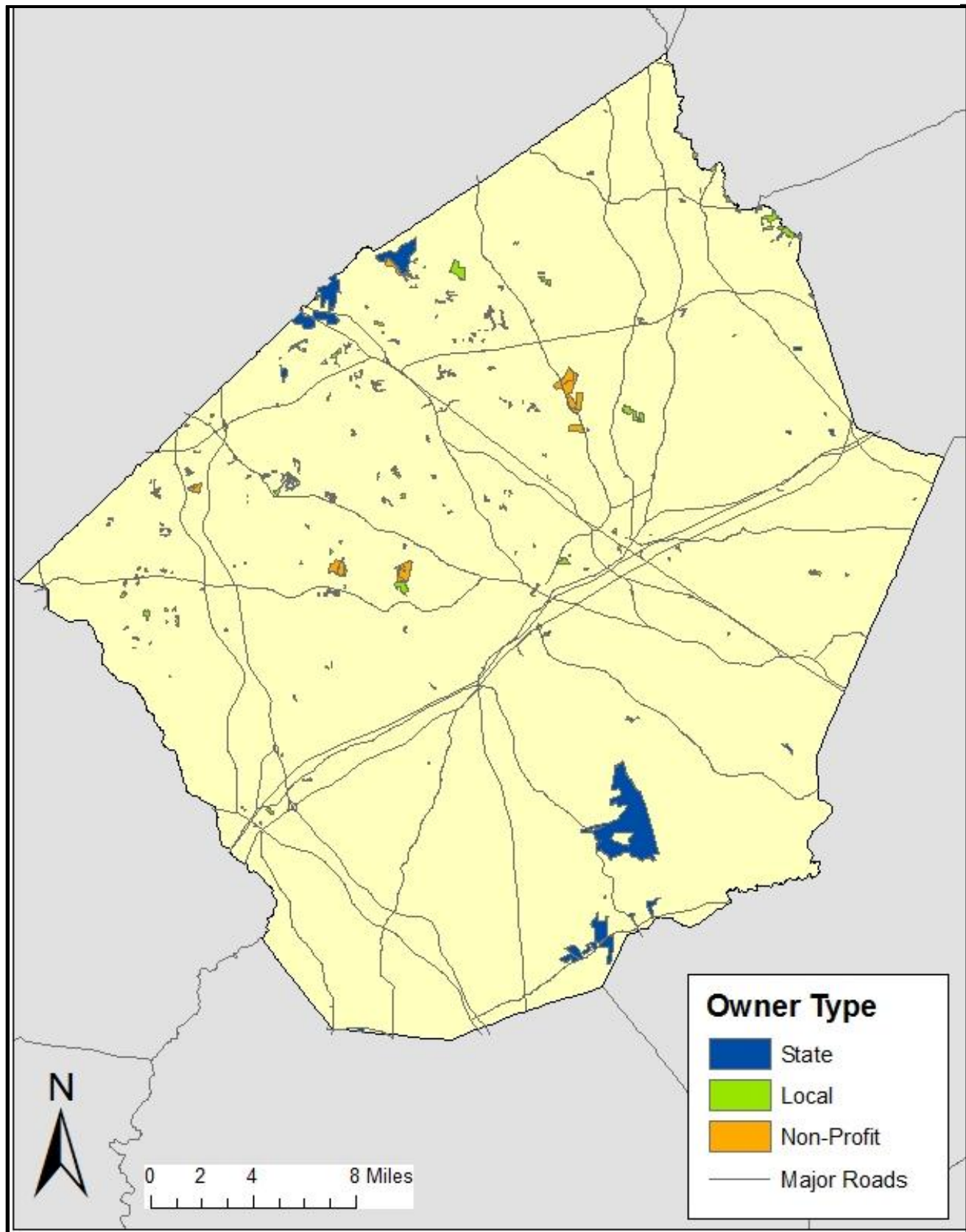


Source: Johnston County Education-Howell Woods



Source: North Carolina Historic Sites- Bentonville

Figure 13 Johnston County Open Space



Recommendations

Next Steps

Each participant in this study was asked what he or she saw as the next steps in open space preservation both at the local level and within the region as a whole. Not surprisingly, there were some responses that specifically tied to projects that the individual locality was working on such as the approval of a recreation master plan, getting the North Carolina General Assembly to commit to a Deep River State Park, or continuing to work on sections of the Mountains-to-Sea Trail. However, there was also a very clear and resounding call for increased regional open space coordination and planning. Even more surprising, was a recurring theme-especially in the more urban counties- that there needed to be a change in how the region perceives open space protection.

“Personally, I think things need to happen more on a regional scale.”

*Chris Snow, Wake County
Director Parks, Recreation,
and Open Space*

More Regional Coordination and Planning:

- Additional regional conservation maps and mapping resources such as interactive maps and geodatabases of shapefiles.
- Creating a more focused *GreenPrint* looking at the more critical priorities and lands that need to be conserved and narrowing the long list of areas to a more manageable list that could be accomplished.
- Developing more partnerships to see what the region could do together to leverage current funds to get additional state funding and accomplish more with less money.
- Continue looking at a regional scale. There is a definite need for a consolidated and coordinated long-term effort looking at what needs to happen within the region as a whole not just what a particular county has accomplished or plans to do.
- Hold another open space summit or additional ways for those working on open space issues to meet with colleagues and report on progress.
- Continued coordination of partners by a regional coalition, agency, or nonprofit such as the Triangle J Council of Governments or the Triangle Land Conservancy.
- The development of more local and regional open space plans and projects.
- A coordinated effort to get the smaller municipalities on board and assist them with developing plans and connecting into larger regional efforts.
- Work on way to evaluate the raw quality of land based on set criteria such as passive recreation needs, water quality, and adjacency to other open space. Durham and Wake counties are already working on this and would benefit from coordinating and expanding their efforts to include lands in other counties.

Change in Perspective:

- Readjustment of priorities to adapt to the changes in landscape (from rural areas to a more urbanizing setting) as well as the situation created by the current national and state economic crisis.
- Tie conservation efforts to qualitative priorities and the services they provide not just the acreage of lands conserved. Especially doing additional research on the economic value of protecting natural resources.
- Change perspective to focusing less on serving human-centric needs and more to protecting the resources that are worthy of being protected and then seeing how they can accommodate other human needs such as recreation or water quality.

“There is an economic value to a community to have green belts or green infrastructure in place or to having its wild places protected...what happens if we build everything out here and totally deplete our natural resources and natural areas? Do we then lose our attraction and what is the economic value to that? We need to start looking quantitatively at the environmental values- the carbon offsets, the biodiversity of the region- and how that contributes to our public health and well being.”

*Greg Schuster, Durham County
Open Space Land Manager*

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Appendix II: Relevant Plans by County

County	Plan Name	Date	Source	Website
Chatham	Parks & Recreation Master Plan Update	2010 (being updated)	Parks and Recreation Department, Recreation Advisory Committee, McGill Associates	http://www.chathamnc.org/Index.aspx?page=851
	Land Conservation and Development Plan		Strategic Plan Development Committee	http://www.chathamnc.org/Index.aspx?page=441
	Inventory of the Natural Areas and Wildlife Habitats of Chatham County, NC	1992	Stephen P. Hall, Marjorie W. Boyer	http://www.chathamnc.org/Index.aspx?page=895
Durham	Durham Comprehensive Plan	2009	Durham City-County Planning Department	http://www.durhamnc.gov/departments/planning/comp_plan/
	New Hope Corridor Open Space Master Plan	1991	Coulter Associates, New Hope Corridor Advisory Committee	http://www.durhamnc.gov/departments/planning/pdf/new_hope_os_master_plan.pdf
	Eastern Durham Open Space Plan	2007	Durham City-County Planning	http://www.durhamnc.gov/departments/planning/pdf/ED_OS_Plan_Adopted.pdf
	Little River Corridor Open Space Plan	2001	Durham City-County Planning	http://durhamnc.gov/departments/planning/pdf/plan_little_river_corridor.pdf
	Durham Trails and Greenways Master Plan	2001	Durham City-County Planning	http://www.durhamnc.gov/departments/planning/pdf/plan_greenway.pdf
Johnston	2030 Comprehensive Plan	2009	Planning and Zoning Department	http://www.johnstonnc.com/files/planning/comprehensive%20plan%2003-02-09.pdf
	Mountains to Sea Trail	2006	Greenway Incorporated	http://www.johnstonnc.com/files/planning/MTS_ExecSum.pdf
Lee	Sanford & Lee County 2020 Land Use Plan	1999	Sanford-Lee County Community Development Department	http://www.sanfordnc.net/planning_development/2020%20plan%20-%20Final%20Draft.pdf
	Deep River Small Area Plan	2001	Sanford-Lee County Community Development Department	http://www.sanfordnc.net/planning_development/deep%20river%20small%20area%20plan.pdf
Orange	A New Era for Parks	2001	Orange County Manager's Office	http://www.co.orange.nc.us/ercd/A%20New%20Era%20for%20Parks.pdf

	Agricultural Development and Farmland Protection Plan	2009	Orange County Agricultural Preservation Board	http://www.co.orange.nc.us/ercd/documents/farmland%20protection/Orange%20County%20ADFPP%20Adopted%2011-17-09.pdf
	A Landscape with Wildlife for Orange County	1997	Triangle Land Conservancy	http://www.co.orange.nc.us/ercd/documents/TLC/tlc_part1/Landscape%20with%20wildlife%20for%20Orange%20County.pdf
	Natural Areas and Wildlife Habitat for Orange County	2004	Orange County Environment & Resource Conservation Department, NC Natural Heritage Program, NC Natural Heritage Trust Fund	http://www.co.orange.nc.us/ercd/documents/Natural%20Area%20Inventory%202004.pdf
	State of the Environment Report 2004	2004	Orange County Commission for the Environment	http://www.co.orange.nc.us/ercd/2004_SOE_index.asp
	State of the Environment Report 2009	2009	Orange County Commission for the Environment	http://www.co.orange.nc.us/ercd/documents/2009%20State%20of%20Environment/SOE_2009.pdf
	Strategic Growth and Rural Conservation Program	2009	Louis Berger Group, UNC Charlotte Urban Institute	http://www.co.orange.nc.us/planning/TDR_files/Final_SGRC_Report_081109.pdf
	2030 Comprehensive Plan	2008	Orange County Planning and Inspections Department	http://www.co.orange.nc.us/planning/PDFs/comprehensive/COMPREHENSIVE%20PLAN%20-%20final%20-%20by%20chapters/All_Chapters.pdf
Wake	Comprehensive Parks & Recreation Master Plan	2008	Bucher, Willis & Ratliff Corporation	http://www.wakegov.com/NR/rdonlyres/27553EB2-5A6D-414F-A14B-696067DE5333/0/paks_masterplan2008.pdf
	Wake County Consolidated Open Space Plan	2006	CH2MHILL, Greenways Incorporated, Trust for Public Land	http://www.wakegov.com/parks/openspace/plan/default.htm
	Trails & Greenways of Wake County, Pocket Guide and Community Resource	2008	Wake County Parks	http://www.wakegov.com/NR/rdonlyres/9DDA9D90-3EC9-45B6-888A-8645F56EFA62/0/GreenwayMap_Final080808.pdf

	Wake County Land Use Plan	2003	Wake County Planning, Development and Inspections Department	http://www.wakegov.com/planning/landuse/wake_county_lup.htm
	Wake County Growth Management Strategy	2003	Clarion Associates	http://www.wakegov.com/planning/growth/strategy.htm

Appendix III: TLC Conservation Projects

The following is a table of all of TLC's conservation properties. Some are owned by TLC while others are part of a partnership project or privately owned but protected by conservation easements. If there is an asterisk (*) by the property name then the property is open to visitors. For more information go to TLC's website at <http://www.triangleland.org>.

County	Property	Stream Corridor	Conservation Type
Chatham	Bynum Beach Canoe Access*	Haw River	Partnership Project
	Condoret Nature Preserve*	Tick Creek	TLC Owned
	George's Creek	Deep River	TLC Owned
	Johnson Homestead	Tick Creek	Private Conservation Land
	Justice Lands	Deep River	Partnership Project
	La Grange Riparian Reserve*	Deep River	TLC Owned
	Lower Haw State Natural Area*	Haw River	Partnership Project
	McIver Landing*	Deep River	TLC Owned
	Pace's Mill Settlement	Haw River	Private Conservation Land
	Second Island	Deep River	TLC Owned
	Seilkop Forestland	Meadow Creek	Private Conservation
	Sheppard Farm	Tick Creek	Private Conservation
	White Pines*	Deep River	TLC Owned
	Rocking Horse Farm	Evans Creek	Private Conservation Land
	Wood's Mill Bend*	Rocky River	TLC Owned
Durham	Boulevard Lands	New Hope Creek	Partnership Project
	Horton Grove*	Little River	TLC Owned
	Leigh Farm	New Hope Creek	Partnership Project
	Little River Regional Park*	Little River	Partnership Project
	Snow Hill Preserve	Little River	TLC Owned
Harnett	Hardee Farm	Cape Fear River/ Deep River	Partnership Project
Johnston	Flower Hill*	Moccasin Creek	TLC Owned
	Holding Farm	Buffalo Creek	Private Conservation Land
	Middle Creek Bottomlands*	Middle Creek	TLC Owned
	Middle Creek Bottomlands II*	Middle Creek	TLC Owned
	Montgomery Laurel Bluffs*	Neuse River	TLC Owned
	Summers Farm	Middle Creek	Private Conservation Land
Lee	Coffer Forest	Deep River	Private Conservation Land
	Endor Iron Furnace	Deep River	Partnership Project
	Knight Forest	Deep River	Private Conservation Land
	Lee County White Pines	Deep River	Partnership Project
Orange	Berryhill Rhododendron Bluffs*	Morgan Creek	TLC Owned
	Borland Creek	New Hope Creek	Private Conservation Land
	Currie Hill	New Hope Creek	Private Conservation Land
	Hollow Rock Trailhead	New Hope Creek	Partnership Project

	Johnston Mill Nature Preserve*	New Hope Creek	TLC Owned
	Kuenzler Wildlife Habitat Preserve	Collins Creek	Private Conservation Land
	Little River Regional Park*	Little River	Partnership Project
	Lloyd-Andrews Historic Farmstead	Bolin Creek	Private Conservation Land
	Maple View Farm	Morgan Creek	Private Conservation Land
	McCauley Mountain*	University Lake	TLC Owned
	Montrose	Eno River	Private Conservation Land
	Morgan Glen	Morgan Creek	Private Conservation Land
	Pegg Hill*	New Hope Creek	TLC Owned
	Pickard Mill	Morgan Creek	Private Conservation Land
	Pickard's Mountain	Morgan Creek	Private Conservation Land
	Shenandoah	Phil's Creek	Private Conservation Land
	Steep Bottom Branch	New Hope Creek	TLC Owned
	Tilley's Branch	Morgan Creek	Private Conservation Land
	Timberlyne	Booker Creek	TLC Owned
Wake	Buffalo Creek Cypress Swamp	Buffalo Creek	Private Conservation Land
	Joslin Garden		Private Conservation Land
	Lake Myra Uplands	Mark's Creek	Partnership Project
	Mark's Creek Wetlands	Mark's Creek	Partnership Project
	Margaret Reid Wildflower Garden		Private Conservation Land
	Richland Creek	Richland Creek	Partnership Project
	The Rocks	Little River	Partnership Project
	Swift Creek Bluffs*	Swift Creek	TLC Owned
	Temple Flat Rock*	Harris Creek	TLC Owned
	Theys Farm	Swift Creek	Private Conservation Land

Appendix IV: Interview Questionnaire

Thank you for choosing to participate in this study on open space preservation in the Triangle. The following questions are intended to gather information and opinions on the conservation efforts that have taken place, current open space opportunities, and planned preservation efforts. Your participation in this study will help researchers develop an accurate and up-to-date vision of protected open space within the Triangle that will assist in future regional planning efforts. If at any time you would like to stop the interview, take a break, or prefer not to comment on a question just let me know.

Participant Contact Information

Name: _____

Organization/ Government: _____

Email: _____ Phone: _____

Mailing Address: _____

City: _____ State: _____ Zip code: _____

Participant Background Information

1. How long have you worked on open space/ land conservation issues in general? Specifically in the Triangle region?
2. What specific topics or projects under the umbrella of open space preservation have you worked on the most?

Planning

1. Does your government/ organization have county wide or area specific plans addressing open space, land conservation, and/ or recreation opportunities that would be useful to this study?
 - If so, can these plans be accessed online? Where? If they can't be accessed online, who should I contact to obtain a copy?
 - If not, is there any other documentation, research, or policies related to conservation efforts in your locality I should know about?
2. Does your organization/ government have any specific goals in regards to open space preservation such as preserving a certain amount of land by a specific time period? Or are there particular kinds of open space that your organization focuses on? If so can you tell me what they are or how can I go about finding this information.
3. Are you familiar with the Triangle Land Conservancy State of Open Space Reports in 2000 and 2002? The Triangle J Council of Government's Greenprint and Progress Report of 2005? The efforts of Reality Check? In what ways have you/ your organization used these documents? How are you/ your organization participating in Reality Check?

Funding

1. Since the last State of Open Space Report in 2002 (as of June 30, 2002), how much has been spent on open space acquisition?
 - On which projects? For how many acres? Using what source of funding (bonds, general revenue, grants etc.)?
2. How much does your government/ organization have budgeted for open space conservation?
 - Over what time period? From what sources (bonds, general revenue, grants etc.)?

Mapping (If your organization has a GIS Technician or mapping specialist I should talk to instead for this information please let me know)

1. Who is your main contact or source for open space mapping?
2. Do you have a site where open space/ land preservation/ greenways/ trails GIS files can be downloaded? If so at what address? Or are there other ways for me to access these files?
3. What coordinate system are your files in or is there metadata available for each file with this information?
4. Is there a list of attributes within each file including their meaning? If so where can I go to get a copy or if there isn't one is there someone I can contact for clarification on attributes?
5. Do you have any additional maps or analysis (either completed or working on currently) that would be relevant to this effort?
6. What about interactive mapping capabilities with property information such as property value, date sold, owner, address, etc.?

Organizational Questions

1. What process does your organization use to define open space preservation? What is your organization's definition of open space?
2. What do you see as the greatest assets/ facilitators towards increased open space preservation both locally and regionally?
3. What do you see as the greatest challenges/ barriers towards increased open space preservation both locally and regionally?
4. What do you see as the next steps in open space preservation in the Triangle?
5. Do you/ your organization have a way of prioritizing investments in open space preservation such as a rubric that you follow? Could I get a copy of this?

Furthering the Study

1. Do you have anyone else you would recommend I speak with?
2. Can I contact you if I have any additional questions about the data/ responses you have provided me with?
3. Can I include you by name within the report's acknowledgements?
4. Can I quote you by name within the report and subsequent presentations?
5. Can I send you a final copy of the report to the email address you provided?

Appendix V: Study Participants

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